Table of Contents

1.0 Introduction

1.1 Overview of EPA's Selected Remedy and Quality of Life Performance Standards

In March 2016, EPA issued the Record of Decision (ROD) for the lower 8.3 miles of the Lower Passaic River. In accordance with Section 12.5 of the ROD for the lower 8.3 miles of the LPR, EPA has developed quality of life performance standards (QoLPS) to ensure that EPA's selected remedy is implemented in such a manner that short-term impacts to the community surrounding the lower 8.3 miles are minimized. The QoLPS address air emissions, odor, noise, lighting, navigation (e.g., use of the river) and traffic and their potential impacts on residents and visitors to the project area during the remedial construction period. EPA and other agencies will review each activity as proposed by the RD Team to ensure that appropriate measures are implemented to minimize quality of life impacts and ensure protection of human health and the environment during the course of the RA. These standards when implemented will promote accountability and ensure that the selected remedy meets the action-specific applicable or relevant and appropriate requirements (ARARs).

The standards will be applied to the predesign investigation, remedial design, and remedial action activities that may affect the community and are intended to minimize, to the extent practicable, Quality of Life (QoL) impacts. The standards reflect impacts only during the construction period – long-term impacts of the remediation project were evaluated in previous documents.

1.2 Rationale for Implementation of Quality of Life Performance Standards

During the public comment period for the Proposed Plan, concerns were expressed about the possible effects of remedial activities on the quality of life (QofL) on people residing near the river or otherwise in the vicinity of the remediation activities. As a means of ensuring that such concerns are addressed and that potential impacts are minimized to the extent practicable, QoLPS have been developed for the planned remediation.

The following steps were completed to define the technical approach to establishing quality of life performance standards:

- Local, state, and federal regulatory standards, guidance documents, and other requirements were reviewed to identify applicable regulations for each of the areas of interest.
- General information on from other environmental dredging projects was reviewed for potential applicability, particularly for areas where regulations are not established.
- Appropriate corrective measures were considered if a standard is not met or is exceeded. These measures may involve a modification in operation or activities,

the use of engineering controls, and/or other methods.

- Dredging operations are expected to extend bank to bank throughout the 8.3 miles of the Lower Passaic River. Over the length of the river, conditions in the surrounding area varies from primarily industrial (below RM 3) to primarily residential (above RM 7) with many areas incorporate a mix of property uses. The distribution of potential types of receptors was reviewed (see Section 4)

1.4 Principles for Development of the Performance

As defined by the EPA, environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. During remediation project such as the Lower Passaic River, this means consideration of the short-term impacts on local populations to achieve a long-term goal (cleanup of the river). These QoLPS are intended to address this goal.

In addition, EPA's Region 2 Clean & Green Policy is aimed at enhancing the environmental benefits of federal cleanup programs by promoting technologies and practices that are sustainable. The objectives of Green Remediation are to: protect human health and the environment by achieving remedial action goals; support human and ecological use and reuse of remediated land; minimize impacts to water quality and water resources; reduce air emissions and greenhouse gas production; minimize material use and waste production; and conserve natural resources and energy.

The RD and RA teams will be responsible for understanding and complying with EPA requirements in these areas during the development and implementation of the QoLPS. The fundamental principles supporting EPA's development of the QoLPS are intended to result in a set of performance-oriented provisions that will guide the contaminated sediment remediation and ensure that the cleanup meets the objectives of the ROD. These principles include the following:

1. The standards were developed to achieve the objectives of the ROD in minimizing impacts to residents, workers, and other visitors to the project area while offering as much flexibility as practicable during the remedial design and implementation of remedial activities.
2. The standards were developed to be performance-oriented rather than prescriptive with regard to means and methods.
3. The standards were developed to comply with federal, state, and local ARARs defined in the ROD where applicable. Where no ARARs exist, other suitable guidance will be applied.
4. The standards were developed to include goals to be achieved and incorporate best management practices based on the lessons learned from the environmental dredging pilot study, the site-specific removal actions and other major contaminated sediment remediation projects that have been completed

or are being implemented.

5. The standards were designed to work both together and individually to achieve the overall goals of the project.

1.5 Document Organization

This document has been broken down into 8 sections as follows:

- Chapter 1 provides an introduction and background information
- Chapter 2 summarizes planned remedial activities (e.g., dredging, capping, transport, and treatment) in the lower 8.3 miles of the LPR.
- Chapter 3 describes the quality of life performance standards categories
- Chapter 4 provides a description of the area and review of potential receptors by location.
- Chapter 5 describes the performance standards
- Chapter 6 discusses the procedures that will be used to refine the standards, if necessary.
- Section 7 provides a list of references and background documents.

This document may refer to the ROD and supporting documents in the administrative record. Some of the concepts, discussions, and conclusions set forth in those documents are included here. Where direct quotations are used, a reference is provided.

2.0 Overview of Performance Standards

The following provides an overview of the objectives of each of the QoLPS.

2.1 Performance Standard for Air Emissions

The Air Emission PS has the following objectives:

- Emissions during the remedial construction, including the predesign investigation, remedial design, remedial action, and site restoration, will comply with state and federal emission limits.
- The RD team will develop a remedial program that minimizes emissions of regulated contaminants. The potential for air emissions based on the RD will be documented through modeling, calculations, or other efforts to verify that air emissions for operations will comply with state and federal emission limits.
- Efforts will be taken during the RA to minimize emissions of regulated air pollutants and other contaminants that have a potential to impact human health. An air quality monitoring program will be used to monitor compliance with the air emission limits.

Additional details of the Air Emission QoLPS are presented in Section 5.1.

2.2 Performance Standard for Odors

The Odors PS has the following objectives:

- Odors released during the remedial construction, including the predesign investigation, remedial design, remedial action, and site restoration, will be minimized / controlled to the extent practicable by the use of best available technology (BAT).
- Efforts will be taken during the RD to develop a remedial program that minimizes odor releases. The areas/activities that have the greatest potential to result in odor formation should be identified during the RD and contingency plans identified to address odor formation for these areas/activities.
- Efforts will be taken during the RA to minimize odor formation to the extent practicable through the use of BAT.
- Odor complaints will addressed in a timely manner as they arise. Complaints will be investigated and steps taken to address the cause of the odors will be relayed to the complainant in accordance with Section 5.8.

Additional details of the Odors QoLPS are presented in Section 5.2.

2.3 Performance Standard for Noise

The Noise PS has the following objectives:

- The RD team will develop a remedial program that minimizes noise levels during

all operations. The potential noise levels based on the RD will be documented through modeling, calculations, or other efforts to verify that air emissions for operations will comply with state and federal emission limits.

- The areas/activities that have the greatest potential to result in noise impacts should be identified during the RD and contingency plans identified to control noise if it exceeds these standards.
- Consideration will be given to the managing the timing and location of operations during the RA, particularly during the nighttime hours, such that noise does not interfere with the use of property in the project area.
- Noise levels shall not exceed limitations established in Table 5.3-XX for either daytime or nighttime operations.
- Where practicable, use of equipment generating percussive noises (e.g., jack hammers, pile driving, vibratory hammers) will be limited to day time hours.
- Noise complaints will addressed in a timely manner as they arise. The complaints will be investigated and steps taken to address the source of the noise will be relayed to the complainant in accordance with Section 5.8.

Additional details of the Noise QoLPS are presented in Section 5.3.

2.4 Performance Standard for Lighting

The Lighting PS has the following objectives:

- The RD team will develop a remedial program that identifies procedures to control lighting impacts on the surrounding property during all operations. The RD will incorporate requirements for downlighting, the use of shrouds, and other control mechanism as necessary to control lighting impacts on residents and visitors to the project area. The potential for lighting impacts will be evaluated during the RD through modeling, line of site studies, calculations, or other efforts to verify that lighting from operations will not impact local residents.
- Consideration will be given to managing the timing and location of operations during the RA such that light intrusion does not interfere with the use of property in the project area.
- The areas/activities that have the greatest potential to result in lighting impacts should be identified during the RD and contingency plans identified to control night time light intrusion particularly in residential areas.
- Notwithstanding the need for adequate lighting for health and safety, ensure that lighting does not pose a safety risk (e.g., glare, blinding) to vehicular traffic in the area.
- During the RD and RA, consideration will be given to the impact of existing screening (e.g., existing structures, vegetation) on light intrusion
- Lighting complaints will addressed in a timely manner as they arise. The

complaints will be investigated and steps taken to address the source of the lighting issue will be relayed to the complainant in accordance with Section 5.8.

Additional details of the Lighting QoLPS are presented in Section 5.4.

2.5 Performance Standard for Navigation / Use of River

The Navigation/ River Use PS has the following objectives:

- The RD will review and select technology (type of dredging platform, size of equipment), work sequence, and other project controls as necessary to control minimize the impact of RA activities on other commercial and recreational users of the river.
- The RD will develop procedures for managing traffic on the river related to the RA activities, maximizing to the extent practicable alternative use of the river.
- Safe working zones around equipment (or procedures for establishing such zones during the RA) will be developed during the RD based on the proposed design.
- Where it is necessary for safety reasons to limit access to portions of the river for small vessels (size to be determined) during the RA, procedures will be developed to communicate these restrictions to the other river users in a timely manner (see Section 5.7). These communications will clearly identify locations and dates of closure of portions of the river.
- Methods for identifying areas with restricted access areas will be established during the RD and implemented during the RA.
- Methods for enforcing restricted access to the river will be developed during the RD. During development of this policy, the RD team will communicate with local enforcement agencies including but not limited to the New Jersey marine patrol and the USCG, to obtain their input. During the RA, the team will implement the standards set in conjunction with local enforcement agencies.

Additional details of the Navigation / River Use QoLPS are presented in Section 5.5.

2.6 Performance Standard for Traffic

The Traffic PS has the following objectives:

- Following site selection, the RD will develop a traffic management plan for the remedial construction, including traffic associated with construction of the sediment processing facility, operation of the sediment processing facility, and in-water operations. The plan will include estimates of the need for on-site parking for workers and truck, sequencing of arriving/departing shipments, truck routes, and penalties for use of non-approved routes during all phases of work. The plan will develop mitigation measures as necessary to prevent overuse of existing infrastructure.
- The RD will identify and evaluate activities that are likely to have a significant

impact on local traffic.

- The communications plan (see Section 5.7) will include procedures to communicate with impacted groups regarding plans for remediation that will impact marine, road, or rail traffic.
- The plan will address safety hazards associated with increased truck traffic, particularly on residential streets, during all phases of the project.
- The plan will address traffic at other remote sites with significant traffic impacts (such as the bypass pumping stations if included in the RD).
- During the RA, procedures to monitor and manage traffic entering and leaving the site(s) to ensure compliance with the traffic management plan will be implemented.

Additional details of the Traffic QoLPS are presented in Section 5.6.

3.0 Description of Project Remedial Activities

3.1 Contaminants of Concern

The primary pollutants identified as a potential risk to human health and the quality of life for this project include:

- Contaminants of concern identified during the RI and FS that pose a human health risk: VOCs, dioxins and furans, PCBs, and mercury.
- Other air pollutants, including PM10, PM2.5, CO, SO2, and NO2/NOx from equipment operations.
- Additional pollutants found to have a high concentration in the sediment during the PDI.

3.2 Selected Remedy in ROD

The ROD issued on March 3, 2016 selected a remedy for the lower 8.3 miles of the LPR that includes the following components:

- An engineered cap that will be constructed over the river bottom of the lower 8.3 miles, except in areas where backfill may be placed because all contaminated fine-grained sediments have been removed. The engineered cap will generally consist of two feet of sand and may be armored where necessary to prevent erosion of the sand.
- Before the engineered cap is installed, the river will be dredged bank to bank (approximately 3.5 million cubic yards) so that the cap can be placed without increasing the potential for flooding. Depth of dredging is estimated to be 2.5 feet, except in the 1.7 miles of the federally authorized navigation channel closest to Newark Bay.
- The remedy will include sufficient dredging and capping to allow for the continued commercial use of a federally authorized navigation channel in the 1.7 miles of the river closest to Newark Bay and to accommodate reasonably anticipated future recreational use above RM 1.7.
- Dredged materials will be barged or pumped to a sediment processing facility in the vicinity of the Lower Passaic River/Newark Bay shoreline for dewatering. Dewatered materials will be transported to permitted treatment facilities and landfills in the United States or Canada for disposal.
- Mudflats dredged during implementation of the remedy will be covered with an engineered cap consisting of one foot of sand and one foot of mudflat reconstruction (habitat) substrate.
- Institutional controls will be implemented to protect the engineered cap. In addition, New Jersey's existing prohibitions on fish and crab consumption will remain in place and will be enhanced with additional community outreach to

encourage greater awareness of the prohibitions until the concentrations of contaminants of concern (COCs) in fish and crab tissue reach protective concentrations corresponding to remediation goals. EPA will share the data and consult with NJDEP about whether the prohibitions on fish and crab consumption can be lifted or adjusted to allow for increased consumption as contaminant levels decline.

- Long-term monitoring and maintenance of the engineered cap will be necessary to ensure its stability and integrity. Long-term monitoring of fish, crab and sediment will also be performed to determine when interim remediation milestones, remediation goals and remedial action objectives are reached. Other monitoring, such as water column sampling, will also be performed.

3.3 Remediation Activities

In order to develop meaningful QoLPS for the expected remedial activities, it is essential to have an understanding of RD and RA activities, including the sequence that those activities will be performed in and the equipment that will be used to complete the work. For example, to develop a meaningful navigation performance standard it is important to understand the expected number of vessels on the river, the vessel sizes, and vessel movements. However, for some standards (e.g., air) where an established limit or other measurable value can be applied, the performance standard depends less on the remedial activity and more on the contaminants found in the dredged sediment.

Information regarding the expected remedial activities used to develop the performance standards described in this document was obtained primarily from conceptual design information presented in the ROD and supporting documents. The QoLPS will be reviewed as the design progresses to ensure that the design is protective of human health and the environment. Typically, at the intermediate (60%) design phase specific methods and equipment (to meet the requirements of the performance standards) are selected by the RD Team and for which specific evaluations can developed.

During the RD phase, a predesign investigation will be conducted to gather additional information on conditions in the river. This will include, but not be limited to, collecting additional sediment cores for geotechnical, geological, and chemical analyses; geophysical and bathymetric surveys; surveys for debris and utility identification, and bulkhead and shoreline integrity; surface and pore water sampling; habitat, fish, and cultural surveys; and borrow site investigations. In addition, studies will be conducted to identify and evaluate sites for the construction of the sediment processing facility and other potential work sites along the river. The impact to the community during this phase of work is anticipated to be minimal, primarily involving additional small boat traffic on the river. However, if the RD requires more extensive evaluations, the potential impacts should be reevaluated.

Assessing the impacts of the RA involves identifying and estimating the effects of remediation activities (such as facility construction and transportation operations) on selected QofL factors. Modeling to evaluate the extent of impacts (e.g., air quality and noise) will be completed by the RD Team using approved models to further evaluate those impacts. Modeling is a typical method used in design processes, with oversight by EPA to ensure accuracy.

At this time, it is anticipated that the primary components of the RD/RA will include:

- Large debris removal
- Dredging (mechanical and/or hydraulic)
- Capping
- Transport of the dredged material by barge or pipeline
- Contaminant containment and structural support(sheet piles, silt curtains), as necessary to address site conditions in specific areas
- Material handling and dewatering at an upland processing facility including water treatment
- Off-site transportation and disposal of processed sediments
- Habitat replacement and reconstruction.

Table 3.0-1 provides a summary of the primary remedial activities based on the design presented in the ROD and supporting documents, and the potential impacts to the quality of life associated with each. Additional details regarding these anticipated remedial activities as they relate to quality of life considerations are described in the following subsections.

3.3.1 Site Monitoring During the RA

A number of monitoring programs will be implemented during the RA to assess the impact on sediment, water, and air quality. These operations will typically involve small boats and will have limited impact on the QoL for most area residents and workers. However, limited impacts to navigation / other users of the river are possible but can be mitigated through a good communications program.

Table 3.3-1: RA Activities and Potential Quality of Life Impacts.

RA Activities	Air Emissions	Odor	Noise	Lighting	Navigation	Traffic
Site Monitoring During RA						
Air sampling						
Water quality monitoring					X	
Bathymetry					X	
Sediment monitoring					X	
Large Debris Removal						
Initial Debris Removal	X	X	X		X	
Additional Debris Removal During Dredging	X	X	X		X	
Dredging[1]						
Mechanical	X	X	X	X	X	X
Hydraulic	X	X	X	X	X	X
Equipment maneuvering			X		X	
Shallow water removal (mudflats)		X	X		X	
Double handling		X	X		X	
apping[1]						
Material transport			X	X	X	X
Placement			X	X	X	
Armoring			X	X	X	
Transportation of Dredged Sediment[1]						
Barge	X	X			X	X
Pipeline					X	
ypass Pumping[1]						
Screening operations	X	X	X	X	X	
Pumping operations	X	X	X	X	X	
Contaminant Release Controls/ Shoreline Stabilization/ Bridge & Utility Protections (as necessary)						
Sheet pile walls			X		X	
Coffer Dams			X		X	
Silt fence					X	
Air curtains or other					X	
Repairs and Replacement to Structures[2]	X	X	X	X	X	X
Material Handling, Dewatering, and Water Treatment						
Site Preparation[3]	X	X	X	X		X
Site Construction	X		X	X		X
Site Restoration			X	X		X
Sediment Offloading	X	X		X		
Sediment Storage (slurry)/Storage Tanks	X	X		X		
Sediment Processing	X	X	X	X		X
Sand Storage	X					X
Dewatered Sediment Storage	X	X		X		
Debris Storage and Decontamination	X	X	X	X		
Debris Storage		X	X	X		
Water Treatment/Water Storage	X	X	X	X		
Leachate Management	X	X		X		
Storm Water Management (Non-Contact)						
Rail Yard and Materials Handling	X	X	X	X		
RR Spurs and RR Car Staging				X		

Transportation and Disposal of Processed Sediment						
RR Traffic (entering/exiting)	X	X	X			X
Truck Traffic (entering/exiting)	X	X	X			X
Habitat Restoration and Reconstruction						
Material transport			X	X	X	X
Placement			X	X	X	
Armoring			X	X	X	

Note:
1. Dredging and capping operations are anticipated to proceed 24 hours per day, 6 days per week.
2. Information developed during the preparation of the ROD and supporting documents indicates that a number of the shoreline support systems are failing or could fail due to in-water operation, requiring some maintenance. In addition, bridges and utilities may require the construction of protective systems to prevent undercutting these structures during the RA. The extent of this work will be further evaluated during the predesign investigation. Depending on the work required, the impacts will vary.
3. As necessary based on the selected site; could include site remediation or soil preparation to support equipment and structures.

3.3.2 Large Debris Removal

Prior to the start of dredging operations, large debris will be removed from the river and transported to the sediment processing facility. It is possible that additional, smaller scale debris removal operations will occur periodically throughout the RA. At the processing facility, the debris will be decontaminated (if possible) and the material recycled. If decontamination is not feasible, the debris will be shipped off-site for disposal in accordance with state and federal regulations.

The impact to the community during this phase of work is anticipated to be short-term and localized primarily involving additional boat traffic on the river and potential short term air emissions and odors when sediments are disturbed during removal operations. Loading operations moving debris to barges may periodically generate noise

3.3.3 Dredging

During the remedial construction, contaminated sediments will be removed from the river bottom by dredging, either using a mechanical dredge fitted with an environmental clamshell bucket or using a hydraulic dredge. If other dredging methods are identified during the RD, they will be evaluated and the most appropriate and effective equipment will be selected for use during construction.

The extent of the dredging operation will vary by location. On average, the river will be dredged bank to bank to a depth of approximately 2.5 feet below the current surface to allow placement of a cap without increasing flooding potential. The actual depth of dredging will be governed by the thickness of the cap developed during the design phase (i.e., a thicker cap would result in a greater depth of dredging). In addition, the remedy will include sufficient dredging to allow for the continued commercial use of a federally authorized navigation channel in the 1.7 miles of the river closest to Newark Bay. The depth of the excavation within the 300 foot wide navigation channel will vary ranging from 25 to 30 feet, including an allowance for cap construction.

Dredging operations are anticipated to be performed 6 days per week, 24-hours per day, and 32 weeks per year, based on a 17-week fish window and up to 3 weeks of other downtime (e.g., weather, mechanical issues). Dredging operations have the potential to result in air emissions, odors, noise, lights, disruption of boat traffic on the river, and traffic disruptions during periods when equipment movement requires low bridges to be opened. These impacts are likely to be of relatively short duration in any given area (several months) due to changing locations as construction shifts from location to location.

3.3.4 Capping

An engineered cap will be constructed over the river bottom of the lower 8.3 miles, except in areas where backfill may be placed because all contaminated fine-grained sediments have been removed. Areas of the river that are subject to a higher erosion potential may need armoring in the form of a rocky layer, to reduce loss of cap material. The cap is expected to consist of two feet of sand, on average, although it may be determined during remedy design that the cap thickness can vary in segments of the lower 8.3 miles as long as protectiveness is maintained.

Cap material will be placed on the river bed using either a hydraulic diffuser or clamshell bucket. As soon as practicable after removal of dredged sediment from each certification unit (CU), capping material will be placed over the dredged area to cover the exposed surface and chemically isolate the residuals layer and remaining contaminated sediment inventory. Armoring, as necessary, will be placed with a clamshell bucket.

Mudflats dredged during implementation of the remedy will be covered with an engineered cap consisting of one foot of sand and one foot of mudflat reconstruction (habitat) substrate.

Capping operations are anticipated to be performed 6 days per week, 24-hours per day, and 32 weeks per year, based on a 17-week fish window and up to 3 weeks of other downtime (e.g., weather, mechanical issues). Capping operations have the potential to result in noise, lights, disruptions to boat traffic on the river, and disruptions to road traffic during equipment movement along the river. These impacts are likely to be of relatively short duration in any given area (several months) due to changing locations as construction shifts from location to location.

3.3.5 Transport of Dredged Material (by Barge or Pipeline)

Dredged materials will be barged or pumped to a sediment processing facility likely to be located in the vicinity of the Lower Passaic River/Newark Bay shoreline for dewatering and processing prior to shipment to an off-site disposal facility. There a number of factors that influence the transportation of the dredged sediments including:

- Location and type of dredging operations
- Type and size of dredges
- Location of land-based sediment processing facilities
- General accessibility and obstructions in the river
- Production rates (hourly, daily, and weekly) for dredging and sediment processing
- Physical attributes of the river and shoreline between the dredge area and the sediment processing/transfer facilities (water depth, hydraulic characteristics, physical barriers, adjacent land uses, and water-dependent uses).

If hydraulic dredging is the selected approach, sediment will be pumped directly to the sediment processing facility. At the plant, the sediment will be discharged in a holding tank prior to processing. However, if mechanical dredging is selected, material will be loaded onto barges for transport to the sediment processing facility.

Each approach will result in different impacts to the quality of life. Pipeline systems associated with hydraulic dredging will typically result in few air emissions and odors in transit but will potentially have more significant impacts on other boat traffic in the river. Barge transportation associated with mechanical dredging have a greater potential for air emissions, odors, navigation, and traffic impacts.

3.3.6 Bypass Pumping

In the event that mechanical dredging is the selected approach, the dredged material will likely be transported by barge from the dredge site to the sediment processing facility. Several bridges along the river will constrict the flow of barge traffic up and down the river. The Clay Street (RM 6.1) and the Bridge Street (RM 5.7) Bridges, while movable, are older and may not readily open. During the public comment period for the Proposed Plan, concerns were expressed that frequent openings of the bridges may not be feasible given their age and condition. In addition, regular openings of the bridges would cause major disruptions to area traffic. One option evaluated in the ROD as an alternative to bridge openings is to pump sediment around this segment of the river; other options may be feasible as well.

A bypass pumping operation would have impacts in two areas:

- To effectively pump the sediment over the anticipated distance, it will be necessary to screen the sediment to remove large items (e.g., rock, debris). This is most effectively done at the dredge site and would entail use of a grizzly screen or similar equipment. This operation is likely to result in the generation of air emissions, odor, noise, lighting, and navigation impacts.
- Screened material would be barged to the bypass pumping station located near RM 6.1. At this station, a large pump would be lowered into the barge and the

contaminated sediment pumped from the barge through a pipeline to the discharge station located near RM 5.7. This operation is likely to result in the generation of air emissions, odors, lighting, noise, and navigation impacts.

3.3.7 Contaminant Release Controls

Depending on the remedial design, temporary control structures to contain contaminant releases may be used during dredging to reduce the potential for dredge-related contaminated sediment resuspension and migration. In addition, some protective structures may be necessary along segments of the shoreline, bridges, or utility crossing, to prevent these items from being damaged during dredging operations. Temporary structures may include sheet piles, silt curtains, coffer dams, and air curtains.

The quality of life impact posed by the use of these systems varies depending on the design, location, equipment used, and installation techniques. Potential impacts could range from noise and vibration (e.g., sheet pile wall installation) to impacts to navigation within the river (e.g., silt curtains, sheet pile walls, and coffer dams).

3.3.8 Material Handling, Dewatering, and Water Treatment

Dredged sediment will require dewatering and other material handling to prepare (or condition) the sediment for transport and disposal. Water generated from the dewatering operations will require treatment prior to discharge back to the LPR.

The sediment processing facility impacts can be broken into two categories: construction and operations. Construction activities would include site preparation (e.g., removal of existing structures, soil preparation, soil remediation [if contaminated]) and actual construction of the facility. Construction is estimated to take approximately 12 months to complete and would potentially results in air emissions (primarily due to dusting), noise, lighting, and traffic impacts. If site remediation is required prior to construction, air emissions and odors are other potential impacts.

During operations the sediment processing/transfer facilities are expected to include the following operations and facilities:

- Sediment offloading
- Sediment storage (slurry) in Storage tanks
- Sediment processing (e.g., screening equipment, hydrocyclones, gravity separation, filter press, centrifuge, solidification)
- Dewatered sediment storage (inside sprung structures)
- Debris storage and decontamination
- Sand storage (recovered from sediment)
- Dewatered sediment storage
- Water treatment and storage (e.g., clarification, multimedia filtration, oxidation, granular activated carbon)

- Leachate management
- Storm water management (non- contact water)
- Loading and staging areas for backfill and cap materials (a separate facility or facilities may be used)
- Rail spurs and railcar staging areas

These operations have the potential to results in a variety of impacts as summarized in Table 3.3-1.

Administrative building and on-site laboratory, equipment and transport vehicle storage, and parking space for staff facilities and equipment storage will be located at the sediment processing facility although these land uses are not anticipated to results in potential impacts. Site restoration impacts will vary based on the planned long-term use of the property but are likely to be similar to other site construction impacts.

In the ROD, it was estimated that approximately 25 to 30 acres of land located in an industrial area along the Lower Passaic River / northern Newark Bay would be needed for construction of the sediment processing facility. The facility's quality of life impacts would be similar to other industrial operations including air emissions and odors, noise, lights, and increased truck and vehicular traffic. The greatest traffic impact is likely to occur during facility construction, estimated at approximately one year.

3.3.10 Transportation and Disposal of Processed Sediment

An estimated --- tons of dewatered sediment will be generated at the sediment processing facility, including up to --- of recovered sand which may be available for beneficial reuse (based on material characteristics). The ROD indicates that processed sediments (except that which may be designated for beneficial use) will be transported to off-site facilities for additional treatment and / or disposal. Potential disposal sites were identified in the ROD and will be evaluated in greater detail during RD.

Because of the amount of material that will be generated and the distance to treatment and /or disposal facilities, it is anticipated that the majority of material will be transported by rail from the sediment processing facility to the treatment and/or disposal facility. Some material may be transported by over the road (OTR) transfer vehicles to either off-site intermodal rail facilities or more local disposal facilities. Recovered sand is likely to be hauled to a local beneficial use site by OTR transfer vehicles. A transportation and disposal plan will be developed as part of the RD.

Primary quality of life impacts associated with the off-site transportation of the sediment will include traffic impacts from increased truck and rail traffic in area; air emissions and odors from the dewatered sediment; and noise impacts from the movement of rail cars or surface vehicles.

3.3.11 Habitat Replacement and Reconstruction

Habitat replacement and reconstruction activities primarily involve placing clean backfill following the removal of sediments. The work is likely to result in impacts similar to other capping activities, although because this work is primarily located near Kearny Point in relatively shallow waters, the impact on other boats in the area should be limited.

4.0 Impact Area and Receptor Evaluation

4.1 General Description of Site and Surrounding Area

The lower 8.3 miles of the Lower Passaic River is located within the LPRSA, which is part of the 80-mile long Passaic River in northern New Jersey (see Figure 4.1-X). The Passaic River has a total watershed of 935 square miles that empties into Newark Bay in the New York / New Jersey (NY/NJ) Harbor. Dundee Dam divides the Upper Passaic River from the Lower Passaic River.

The LPR flows through some of the most urbanized and industrialized areas of New Jersey, including the city of Newark. Approximately 1.4 million people reside in the New Jersey counties of Essex and Hudson, which surround the Lower Passaic River (United States Census Bureau, 2010). Existing land use adjoining the lower 8.3 miles is primarily developed (i.e., 85 percent of the area is classified as urban), while forests, wetlands, and other land uses comprise the remaining 15 percent. Intensive commercial and industrial uses occur near the mouth of the Lower Passaic River and upper portions of Newark Bay, in part to take advantage of the multi-modal transportation infrastructure that includes roadway, railway, air, and marine transportation services. Proceeding upstream from approximately RM4, the Lower Passaic River continues to include commercial uses, but starts to include more commercial, recreational and residential uses. By RM 7, uses are primarily residential. There are narrow bands of park and open space along the lower 8.3 miles.

The LPR is connected to the NY/NJ Harbor Estuary and the Hackensack River through Newark Bay. Although originally a shallow tidal estuary, deep navigation channels are maintained in Newark Bay to provide ocean-going container ship access to the Port Newark-Elizabeth Marine Terminal along the bay's western side. These navigation channels originally extended northward from Newark Bay into the Lower Passaic River and the Hackensack River, but the channels in the northern end of the bay and the rivers have not been maintained for decades.

4.2.1 City of Newark

The City of Newark extends along the western side for the LPR from RM 0 to RM 8.3. Downtown Newark is located between approximately RM 4.6 and 6.1. Downriver from the downtown area (RM 0 to 4.6) land use is primarily industrial with some commercial/service and other urban facilities. North of the downtown area, starting at RM 4, residential properties become more apparent, interspersed with commercial/service operations. However, in most instances, residential property is located several blocks inland from the river with commercial and industrial (active and abandoned) properties along the shoreline. There are a number of parks and recreational facilities located along the river and within the primary impact zone.

4.2.2 Town of Belleville

North of the City of Newark on the western shoreline is the Town of Belleville. Development in Belleville is similar to the development in the adjacent section of Newark.

4.2.3 Town of Harrison

The Town of Harrison extends from approximately RM 3.5 to RM 5.9, covering approximately 1.3 square miles including approximately 1.2 squares miles of land area and 0.1 square miles of water. The town is bounded by the Lower Passaic River on the south and west and by the Borough of East Newark and the Town of Kearny on the north and by the Town of Kearny on the east. The southern portion of the town is primarily industrial with the Red Bull Stadium located along the banks of the Lower Passaic River. Residential properties are primarily located in the north/north east portion of the town and are intermixed with commercial development.

4.2.4 Borough of East Newark

The Borough of East Newark is extends from approximately RM 5.8 to RM 6.3, encompassing approximately 0.1 square miles. The town is bounded by the Lower Passaic River on the west, by the Town of Harrison on the south and east and by the Town of Kearny on the north. The majority of the land use in the borough is residential.

4.2.5 Town of Kearny

The Town of Kearny extends from RM 0 to approximately RM 9, with the exception of RM 3.5 to RM 6.3, where Harrison and East Newark abut the river. The total area of Kearny is approximately 10 square miles consisting of approximately 9 square miles of land area and 1 square mile of water area. The land area is divided into three broad sections, referred to locally as the "Uplands", the "Hackensack Meadowlands" and "South Kearny". Of the total land area, approximately 21 percent is residential and commercial and 20 percent is industrial.

The residential area is primarily in the eastern and northwestern portions of the Town. The "Uplands" are north of RM 6.3. Single-family units account for roughly 35 percent of the total housing stock; multi-family structures account for roughly 55 percent; and multi-family apartment buildings for roughly 10 percent.

The Town's principal industrial area is situated on the South Kearny peninsula, at the confluence of the Hackensack and Passaic Rivers at Newark Bay. This area is also home to a major CSX intermodal facility, and other rail access is available for freight and commuting.

4.2.6 Borough of North Arlington

North of the Town of Kearny on the eastern shoreline is the Borough of North Arlington. Development in North Arlington is similar to the development in the adjacent section of Kearny, primarily residential and mixed use.

4.2 Potential Types/Categories of Receptors

To assess the potential impact of the remedial construction on the different types of receptors in the area, the distribution of different types of land use in the area surrounding the project was evaluated. Using information from several publicly available GIS databases, land uses were broken down in the following categories, as shown on Figure 4.2-1 through--.

- Residential
- Commercial/service
- Industrial
- Recreational
- Utilities/Transportation/communications
- Other Urban
- Non-urban land cover (trees, wetlands, water)

Also shown on the figures are other features of note such as hospitals/clinics, schools, places of worship, and recreational facilities. The existing GIS databases used in this analysis reflect conditions available in the area between 2012 and 2016.

The area shown extends approximately 2500 feet on either side of the river from RM 0 to RM 8.3. Based on experience at other similar types of remedial construction projects, the 2500 feet distance (slightly less than ½ mile) was selected as representative of the text to which receptors are mostly likely to be impacted by remedial activities along the river. This does not imply that areas outside this zone will not be periodically impacted by the RA. For instance, periodic noise or traffic associated with the RA may be experienced at a greater distance under some conditions. And some impacts, such as lighting, may not extend across the entire primary impact zone (PIZ). In general, the quality of life impacts typically associated with construction projects dissipate with distance from the source and 2500 feet on either side of the river was selected for this analysis as the PIZ.

The following is a brief generalized description of five major categories of receptors located within the PIZ. This summary is very general and used to gain an understanding of the typical impacts for the average member of each receptor category.

- Residential receptors are adults and children who reside the majority of time in a house, apartment, condominium or other dwelling within the PIZ. Because residential receptors are likely to spend the majority of their time (more than 50 percent) within the impact zone, this group is the most likely to feel the effects of the RA in one or more of the impact categories.
- Commercial / service receptors fall into two groups: workers at commercial establishment or service providers and consumers visiting these facilities. Workers are typically in the area of the commercial / service facilities 8 to 10

hours per day, up to 5 days a week (schedules will vary by the type of establishment) or, on average, roughly one third of their day. Consumers, on the other hand, are typically short-term visitors who can leave the area once their visit is concluded.

- Industrial receptors are similar to commercial worker receptors; they are on-site for a limited number of hours per day, typically 5 days per week.
- Recreational receptors are typically short-term, one time or periodic visitors to the area. The impact to recreational receptors is likely to be limited and based primarily on the timing of their visit(s) to the area. One group of recreational receptors that is likely to be impacted during the RA area users of the river such as boaters and rowing crews. Because they routinely use the river, they are likely to be more severely impacted than other recreational users and may be displaced from areas that they have frequented in the past while dredging and capping operations are underway.
- Special use facilities are not receptors but physical locations where special groups of receptors are housed on a part time or full time basis. When assessing impacts, special care may be warranted when evaluating locations including these facilities. These types of facilities include
    - Schools, day care facilities and other facilities used by children for a significant portion of the day.
    - Hospital, medical facilities, nursing homes, or other care facilities which may house sick or aged people with compromised immune systems or are otherwise susceptible to stress.
    - Recreational facilities
    - Places of worship.

It should be noted that receptors may fall into one or more of these categories.

Figures – through --- show the distribution by land use of the various receptor groups. This distribution varies along the length of the river with the majority of the residential areas located in the northern third of the river and the majority of the industrial facilities located with the southern third of the river. The middle third provides a mix of land uses. It should be recognized that this discussion is general in nature and is provides only a general assessment of conditions in the PIZ. Residential developments can be found in the lower one third of the PIZ and industrial operations in the upper one third. During the RD, the RD team needs to complete a more detailed analysis of the receptor distribution throughout the PIZ and an assessment of the potential QOL impacts throughout the area.

5.0 Quality of Life Performance Standards

Quality of life performance standards are designed to minimize the potential for impacts on the community from the implementation of the RA for the Lower Passaic River. The quality of life performance standards will not supersede other federal and state regulations that apply to project operations but are intended to work in conjunctions with these standards and to provide guidance in areas where not existing standards exist.

Each standards (air quality, odor, noise, lighting, navigation and traffic) is presented in the following general format:

- Introduction;
- Development of the standard;
- Requirements of the standard
- Monitoring and demonstration of compliance
- Contingencies and mitigation plans
- Reporting, and notifications requirements.

Compliance with the quality of life performance standards will be verified and documented throughout the RD and RA. Key points regarding implementation and compliance with the standards are:

- Compliance with the performance standards must be determined through analysis performed during design and demonstrated during the course of the RA.
- EPA and, as appropriate, other agencies will monitor the remedial activities to confirm compliance with the standards.

The performance standards presented in this section were developed based on an evaluation of the potential impacts (Section 3) associated with the anticipated remedial activities (Section 2) as well as the potential receptors (Section 4). Applicable regulations and requirements are cited and presented in the discussion of each performance standard. Supporting documents, as necessary for the development of the standard, are provided in the Appendices.

It should be noted that remedial construction activities were divided into two types of operations: stationary (such as the sediment processing facility) and mobile (such as dredging platforms, capping operations, or sediment transport). Existing regulatory frameworks may be applied differently to stationary and mobile operations. Where this occurs, it is noted in the performance standard.

5.1 Performance Standards for Air Emissions

5.1.1 Introduction

The air quality performance standard addresses the potential exposure of adults and children (i.e., receptors, see Section 4) in the project area to air emissions during the RA. The effects of diminished air quality on the quality of life can range from a reduction in the enjoyment of outdoor activities to impacts on human health and the environment.

Air pollutants released into the atmosphere disperse as they move with air currents. The degree of impact depends on the type of air pollutant released, the duration of the release, the distance between the emission source and the receptor (i.e., the person who could come in contact with the air pollutant), environmental conditions (e.g., weather), the susceptibility of the receptor to the air pollutant, and the toxicity of the air pollutant. This section is concerned with the health impacts of air emissions. The potential impact of odors from air emissions is discussed in Section 5.2.

Workers working in the project area and residents living on property along the river are the primary receptors of air emissions resulting from the RA. While other members of the public such as boaters or visitors may potentially be exposed to air emissions during the RA, this exposure would generally be of short duration. Because the standard has been developed to protect the primary receptors (who have longer potential exposure periods), they will also be protective of secondary (i.e., transitory) receptors.

This quality of life performance standard has been established to ensure that potential impacts related to air emissions during the RA are minimized. At this time, based what is known from experience at other large sediment sites, recent remediation work on sections of the Lower Passaic River, and the concentration of contaminants present in the sediment, EPA does not expect project-related air emissions to exceed established air emission criteria. The RD Team will be responsible for conducting a detailed analysis of potential pollutant emissions from remediation operations and to verify that emissions rates do not exceed the limits set out in this performance standard. The RD Team's detailed analysis of potential air emissions will require further evaluation of both the contaminants present within the sediments of the lower 8.3 miles (which affects emissions from volatilization and dusting) and the proposed construction activities (e.g. specific types of equipment, truck trips, schedule). The standard requires an evaluation of emissions during the design process because it will affect the need for and the selection of air pollution control equipment and the activities associated with sediment handling and processing. In general, the greater the volume of sediment handled and processed and the higher concentrations of pollutant in the sediments, the greater the potential for pollutant emissions.

Annual emission rates from stationary sources are regulated by NJDEP under NJAC 7:27-8, Permits and Certificates for Minor Facilities (and Facilities Operating without an

Operating Permit). However NJAC 27:8 addresses only stationary sources such as the sediment processing facility and its components, not mobile sources. Therefore, the focus of this performance standards is on emission pathways for mobile sources. Stationary sources will need to meet the substantive requirements of NJDEP emissions regulations by establishing control measures and monitoring requirements for the stationary sources. The dividing line between stationary and mobile sources will be discussed with NJDEP during their review of the requirements for stationary sources. This draft of the performance standards makes assumptions on the dividing line and will have to be revised once the discussions with NJDEP are concluded.

The air quality performance standard is developed for the protection of the residents potentially impacted by the RA. Protection of workers from harmful air emissions will be described in the worker HASP, to be developed by the RD Team.

5.1.2 State and Federal Regulations and Guidance

The quality of life performance standard for air emissions is based on existing applicable air quality standards and guidelines, and takes into consideration existing risk analyses and studies of the toxicological effects on human health.

Consideration was given to the use of two standards: one for commercial and industrial areas, and the other for residential areas. However, based on the receptor analysis performed in Section 4, there is little geographic separation between residential and commercial/industrial areas along most of the river making separate standards impractical. EPA may be willing to develop a commercial/industrial standard within selected areas (e.g., between RM 0 and RM 3) if the RD team can provide documentation that such a standard would be protective of human health.

The air quality performance standard criteria are primarily based upon risk assessments and calculations using information from EPA's consensus database for toxicity information, the Integrated Risk Information System (IRIS), federal and state regulations, and thresholds emission levels developed by other environmental agencies. Both carcinogenic and non-carcinogenic thresholds are included.

The following regulations and thresholds were reviewed in developing the air emission performance standards.

- Clean Air Act (CAA), 42 U.S.C. §§ 7401-7671; codified at 40 CFR Subchapter C, Parts 50-97
- EPA IRIS
- EPA Regional Screening Levels (RSLs)
- EPA Region 2 Clean and Green Policy
- Occupational Safety and Health Administration (OSHA) Occupational Safety and Health Standards (29 CFR 1910.1000 – 1052)

- New Jersey Air Pollutant Control Act
- NJAC. 7:27-8, Permits and Certificates for Minor Facilities (and Facilities Operating without an Operating Permit)
- New Jersey Remediation Standards NJAC 7:26D
- New Jersey regulations (NJAC 7:27-3) Opacity Regulations

Appendix XX includes a compilation of these regulations and thresholds for pollutants with high sediment concentrations in the Lower Passaic River.

5.1.3 Development of Standard for Air Emissions

Potential emission scenarios were examined to assess the type of pollutants that could be emitted during the RA from mobile sources. A compilation of establish regulatory limits for a range of constituents potentially present in the sediment is presented in Appendix XX. Based on these standards, a "Concern" and "Exceedance" Levels were established (Appendix XX) for each constituent.

- The exceedance level was established based on the lowest published exposure limit from the relevant regulatory limits and guidance documents consulted (listed above in previous section).
- The concern level was defined as 80 percent of the exceedance level for each parameter.

The concern and exceedance levels are focused on specific dioxins, metals, VOCs, SVOCs, pesticides and PCBs known to be present in the Passaic River sediment. EPA has not developed a numerical performance standard for ozone precursors (NOx and VOCs generally) because the General Conformance requirements for NOx and VOC emissions in non-attainment areas do not apply to direct emissions from Superfund cleanup actions. [1]

During the RA, the RA Team will be mitigate exceedances of the performance standard while continuing project remedial activities. Occasional short-term exceedances are not expected to produce adverse health effects since concentrations are unlikely to exceed acute toxicity levels based on concentrations detected in the sediment and exceedances are likely to be detected before cumulative impacts would occur. Oversight by EPA will ensure that the project will not have an adverse impact on human health. Protection of workers on the site will be addressed in the worker HASP.

5.1.4 Design Evaluation and Demonstration of Compliance

The following actions will be taken to demonstrate compliance with the air emission performance standards identified in Appendix XX.

[1] 40 CFR 93.153 http://www.ecfr.gov/cgi-bin/text-idx?SID=c8190c2952dcfbfbaa35f20501da57e4&mc=true&node=se40.22.93_1153&rgn=div8

Background Air Quality Monitoring

The RD Team will conduct air quality monitoring prior to construction to determine existing concentrations of parameters in the project area. This monitoring is necessary to identify any existing sources of air parameters unrelated to the RA (such as existing industrial facilities) so that the contribution of the RA to ambient air pollutant concentrations can be properly identified.

Air quality sampling may also be conducted at locations near the river and away from the river to determine background concentrations. Differentiating between the pollutants already present in the atmosphere and those associated with the remediation requires concurrent background sampling.[2] Establishment of baseline and background monitoring will provide the information needed by the RA Teams and EPA to determine whether the pollutant level detected during the RA are project-related. This will also assist in identifying the most appropriate course of action in the event of an exceedance.

The RD Team will submit a baseline air quality monitoring plan to EPA for review and comment. The plan should address the following elements:

- Proposed locations for baseline air quality monitoring sites. Monitoring sites will be oriented towards sensitive receptors and may be representative of a geographic area within the project area with similar patterns of land use.
- Proposed duration and frequency of monitoring. At least one month is recommended for each monitoring location to account for some temporal variability in emissions and meteorology; if any concentrations within 50 percent of the concern level are identified further follow-up monitoring may be necessary to confirm the background level of different parameters.
- Proposed monitoring equipment make and model, discussion of equipment detection limits, equipment testing procedure and equipment calibration procedure.
- Analytical methods for each parameter.
- Baseline meteorological data collection.
- Data handling procedure.

The RD Team will prepare a baseline air quality monitoring report documenting the monitoring effort and results in comparison to the concern and exceedance levels identified for each parameter. The original monitoring data will be provided to EPA in electronic format.

Emissions Analysis and Dispersion Modeling

As part of demonstrating compliance with the performance standards, the RD Team will

[2] Grande, David. 1999. Fox River Remediation Air Monitoring Report: Ambient PCBs during SMU 56/57 Demonstration Project. PUBL-AM-310-00, Wisconsin DNR Bureau of Air Management, August-November 1999.

estimate the potential emissions of various parameters that are anticipated during various phases of the RA and conduct dispersion modeling to estimate concentrations of parameters at sensitive receptors. An initial sensitivity analysis may be useful in identifying which parameter(s) are controlling for a particular phase of RA activity. In this way, the workload of analyzing all the potential parameters in detail can be eliminated if certain key marker parameters are not above concern or exceedance levels.

The emissions analysis must substantiate the sediment handling rates, concentrations of parameters in sediments, volatilization rates, control factors and other assumptions necessary to determine emission rates for dispersion modeling. The substantiation of emission rates will take into account the sediment sampling results, the proposed RA design parameters, emission rates from other remediation projects and available guidance documents.

An acceptable dispersion model (such as AERMOD) will be used for predicting impacts from dredging and sediment processing activities to verify compliance with the standards under typical operating conditions. Dispersion modeling will be conducted using five-years of representative meteorological data, incorporate terrain data, and predict concentrations over a receptor grid network that includes all sensitive receptors within 1,000 feet of the shoreline. Dredging activity will generally be represented as an area source in AERMOD.

The RD Team will prepare a RA air quality modelling report summarizing the methodologies and assumptions used in the air quality modeling for review by EPA. The report will include a tabulation of the time periods that particular sensitive receptors would potentially be exposed at concentrations above the concern or exceedance levels (if any). The report will discuss modifications to the design of the RA to avoid or minimize predicted exceedances.

The design will be reviewed by EPA in consultation with NJDEP to ensure that proper mitigation methods are incorporated into the design. Because quality of life performance standards are performance-based compliance criteria, the designers have the flexibility to design the remediation process. However, the RD Team is responsible for demonstrating that the design will minimize impacts on air quality to the extent practicable.

Air quality monitoring plan

The RD team will develop a monitoring program for implementation during the RA addressing the following elements:

Air quality monitoring locations and sampling frequency

The RD Team will propose representative monitoring locations, and sampling frequency (such as five days on, two days off) for each phase of the RA. It is anticipated that

monitoring equipment locations will shift with the work effort throughout the five to six year construction schedule.

Air monitoring stations will be established around the perimeter of the sediment processing/transfer facilities and at locations designated to ensure collection of upwind and downwind data at the dredging locations. Based on wind data at Newark International Airport (KEWR), the predominant wind flows from SW and W towards NE and E. (See Figure 6-1.) The specific number and location of the stations will be recommended by the RD Team based on the areas with the highest predicted impact to nearby sensitive receptors from the modeling exercise. While the air monitoring stations may be mobile and temporary, permanent air monitoring stations may be established in areas of greater population where longer periods of work are anticipated (i.e., near the sediment processing/transfer facilities).

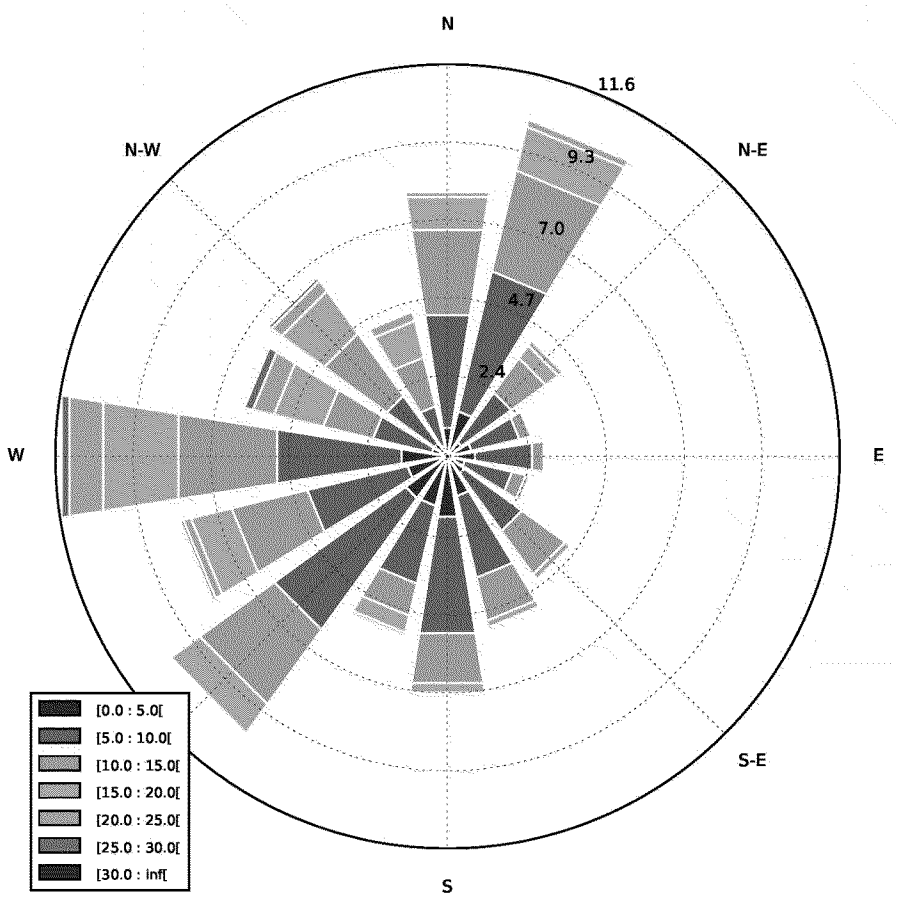


Figure 1: Wind Rose Plot showing the Percent Distribution of Wind at KEWR (ADD SOURCE)

Air Quality monitoring equipment specifications

The RD Team will identify appropriate air monitoring equipment addressing the different parameters and locations.

Analytical Methods and QA/QC

The RD Team will propose appropriate analytical methods for each parameter and describe the sampling QA/QC procedures to be implemented. The performance standard does not specify where the analytical testing should be conducted (on-site laboratory or off-site); however, it does require that the analytical testing be completed by an EPA-approved laboratory on a maximum 72-hour turnaround-time basis. EPA may request a shorter turnaround time during start-up of operations or changes in operations. Additionally, EPA will request shorter turnaround time in situations where data is within concern or exceedance levels. The purpose of the shorter turn-around time is to ensure adequate time for corrective action when levels are high or operations are new or changing.

Training requirements for air quality monitor personnel

Training requirements for staff in charge of air monitoring equipment will be identified in the proposed monitoring plan.

Meteorological and other data collection

The monitoring plan will identify and address types of meteorological data that will be collected during noise monitoring events. Examples of the types of data to be collected include:

- Equipment in use and calibration results
- Monitoring results
- Source/distance to receptors
- Time of day
- Weather conditions
- Prevailing wind
- Activities under way at time at the source area
- Crew (particularly for mobile operations)
- Other potential air emission sources in area

Data Handling and Reporting

TBD

5.1.5 Monitoring

During the RA, the RA Team will monitor air parameter concentrations in accordance with the air quality monitoring plan, to demonstrate compliance with the performance standards and identify specific locations or activities requiring corrective actions. The RA Team will regularly report the results of air monitoring to EPA for review and comment. Proposed modifications to the monitoring program to address changes in the RA activities will be submitted to EPA for review.

The point of compliance for air emissions monitoring is the receptor. However, locations

closer to the source of the air emission may be acceptable for demonstrating compliance. For example, during dredging operations the shoreline may be considered an acceptable location for monitoring if the levels are below the standard and receptors are more distant than the shoreline.

Sampling data will be evaluated to determine the accuracy of the RD Team's projections of ambient air impacts through modeling and to demonstrate compliance during operations.

5.1.6 Mitigation and Contingencies

The RD Team will prepare and submit a contingency plan for review by EPA. The contingency plan will delineate the actions to be taken in response to exceedance of the concern or exceedance levels during implementation of the RA. .

Response to Concentrations above Concern Level

The following steps will be taken with air quality concentrations exceed the Concern Level as specified in Appendix XX.

a) Verbally notify EPA within 48-hrs of receiving analytical results.
b) Weekly reporting will include information on the location and time of exceedance, description of the RA work ongoing at the time of the exceedance, and personnel involved.
c) Investigate the cause of the exceedance and whether it is likely to reoccur. The investigation should be undertaken or overseen by personnel with appropriate air quality monitoring experience and education. Investigations should consider the available monitoring data, meteorological data and RA activity information to draw conclusions about the potential causes of pollutant concentrations above the control level. If available data is not sufficient to explain the cause of the elevated concentration, additional follow-up monitoring may be required to complete the investigation. Such follow-up monitoring could address whether a particular piece of equipment or process is generating an abnormal emissions for example.
d) Determine if mitigation (such as additional dust control for a particular activity, or slowing the rate of soil transfer under certain meteorological conditions) should be considered to prevent further exceedances based on the results of the investigation into the cause of the exceedance.

Response to Noise Levels above Exceedance Level

The following steps will be taken with air quality concentrations exceed the Exceedance Level as specified in Appendix XX.

a) Verbally notify EPA within 24-hrs of receiving analytical results.
b) Weekly Reporting should include information on the location and time of

exceedance, description of the RA work ongoing at the time of the exceedance, and personnel involved.

c) Provide written notification to EPA within 24-hrs by phone or email, and include in weekly summary report.
d) Investigate the exceedance as discussed under control level exceedance, above.
e) Identify and implement mitigation if the exceedance lasts for more than four hours or if the exceedance is repeated within a one week period.
f) Within ten days of discovery of the exceedance, the RA Team will provide EPA with corrective action report describing causes of exceedance and mitigation implemented.

The primary difference in response to concentrations over the exceedance level as opposed to the control level is that the exceedance level represents a health risk warranting temporarily modifying or suspending portions of remedial operations in order to establish additional mitigation. The contingency plan will identify the communication protocol and procedures for temporarily suspending work based on an exceedance and the conditions under which work can be resumed.

Overview of available mitigation measures to be discussed in the contingency plan

Since the greatest potential for emissions is during sediment handling and processing activities, those periods also represent the greatest potential for impact on the community. The potential for emissions increases with

- During handling for sediment
- In locations of higher concentrations of contaminants in sediment
- Higher ambient temperatures
- When sediments become dry and have the potential to become airborne.

Engineering controls and mitigation measures are readily available and can be implemented to control such emissions. Examples of these measures include conducting sediment processing within structures with negative air pressure or erecting wind screens, covering material stockpiles or controlling the shape and placement of the piles, minimizing staging time, adjusting the surface area/volume ratio during material handling by using larger excavation equipment, spraying biodegradable foam over exposed dredged sediment, and covering exposed sediment on barges and trucks.

5.1.7 Reporting

The air quality monitoring plan requirements described above will include submittal of regular progress reports that include information related to emissions near the sediment processing/transfer facilities and dredging operations, ambient (background and baseline) pollutant levels, and monitoring plan adjustments. The RA Team will provide weekly reports to EPA in conjunction with updates to the project implementation schedule. Specific detailed requirements for these reports will depend

upon the specific nature of the design and the monitoring plan. Specific technologies that will be determined in the design may also require reporting to other agencies (e.g., NJDEP).

All complaints received will be logged, investigated, and reported in accordance with Section 5.8 and discussed in the progress report for the time period in question.

5.1.8 Notification

As noted in section 5.1.6, EPA will be verbally following receipt of any analytical report documenting an exceedance of the concern or exceedance criteria.

Following verbal notification, a report will be prepared that describes the activities involved near the monitoring station where the exceedance was observed including time, place, and conditions under which the exceedance occurred; a description of any immediate mitigation as required in the contingency plan; additional mitigation if warranted; and an analysis of the likely cause for the exceedance. The written report will be provided to EPA within three working days of receipt of the laboratory results documenting the exceedance. The report will include background and baseline monitoring data to help determine whether the project is the source of the exceedance or whether there are external reasons for the exceedance.

EPA will evaluate available information to determine whether the RA Team has adequately protected the public and may continue operations. EPA may require the RA Team to implement additional measures (such as investigating the cause of exceedances or additional monitoring) or, if work must be temporarily stopped, to adjust or engineer additional mitigation and contingencies.

5.2 Performance Standards for Odor

5.2.1 Introduction

Odors are a sensation resulting from inhaled volatile chemicals (i.e., odorants) making contact with the olfactory area in the nose and registering in the brain. Because susceptibility to different odorants varies by the chemical and the individual perceiving the chemical, predicting and controlling odors can be difficult. This odor performance standard has been developed to prevent the release of odors that could unreasonably interfere with the comfortable enjoyment of life and property.

These performance standards primarily address releases from mobile facilities such as dredging platforms and sediment transport operations. Similar to air emissions (Section 5.1), the RD and RA team will be responsible to verify substantive compliance with NJDEP air regulations controlling odor releases from stationary facilities. The focus of this performance standards is therefore on emission pathways for mobile sources.

5.2.2 Odor Perception and Characterization

The sensory perception of odors has four major dimensions: detectability, intensity, character, and hedonic tone (EPA, 1992) as described below.

- Detection. Odorant detectability (or threshold) refers to the theoretical minimum concentration of odorants that can be perceived by trained personnel in odor panels. There are two basic types of odor thresholds: the detection threshold (lowest concentration at which the average odor panel member notices an odor, but cannot necessarily identify it) and the recognition threshold (lowest concentration at which the average panelist can identify the odor). Compounds with a sulfur atom in their structure tend to have the lowest odor thresholds.
- Intensity. Intensity refers to the perceived strength of the odor sensation. Intensity increases as a function of concentration. The relationship between perceived strength (intensity) and concentration is defined by Stevens' Law. represented as follows:

  $$\log S = n \log I + \log K,$$

  which is a linear function with slope equal to n. The slope of the function varies with type of odorant. A low slope value would indicate an odor that requires greater relative dilution for the odor to dissipate; a high slope value indicates an odor that can more quickly be reduced by dilution. In general, substances with low thresholds yield low slopes and those with high thresholds show high slopes.
- Character. Character refers to what the substance smells like. These include descriptors like sweet, sour, pungent, fishy, hay-like, burnt, etc. Odor characteristics for 654 different substances can be found on ATSDR's website

(https://www.atsdr.cdc.gov/odors/search_results.html).

- Hedonic tone. This dimension represents a judgment of the relative pleasantness or unpleasantness of the odor. Perception of hedonic tone is influenced by such factors as subjective experience, frequency of occurrence, odor character, odor intensity, and duration.

Odorants can act as additive agents, counteractants, masking agents, or be synergistic in nature. A person's reaction to an odorant is based on a number of variable including previous experience, relationship to the odor-producing entity and the sensitivity of the individual. Weather (temperature, humidity, wind direction) can affect the volatility of compounds, preventing or enhancing movement into the gaseous phase where an odor can be dispersed downwind. Over time odor fatigue (desensitization) or odor adaptation (acclimation), can occur.

5.2.3 Odor Formation

Odor formation during the remedial action is related to various constituents in the sediment. In general, in the case of the lower 8.3 miles, these constituent can be broken into two categories: chemical-based and organic-based:

- Chemical- based odors are primarily from VOCs/SVOCs (including PAHs) in chemicals discharged to the river from industrial and municipal wastewater sources. The types of odors vary depending on the chemicals that were historically released to the river but odors such as solvents, petroleum smells, moth balls, have all been reported at other large dredging projects.
- Organic-based odors are primarily related to wastewater (including CSOs) and other discharges to the river containing organic material. The decomposition of this material under anaerobic or anoxic conditions can result in the formation of hydrogen sulfide, which is commonly characterized as a rotten egg smell. Hydrogen sulfide can be detected at concentrations far less than would be damaging to human health. In most situations, the lower concentration levels are uncomfortable enough that a person would leave the area before the pollutant would be harmful. However, a person can become desensitized to hydrogen sulfide at high concentrations and might underestimate the concentration levels. Therefore, if hydrogen sulfide is detected by workers or the public, monitoring will be required to provide an accurate measurement of the concentration levels. In previous work on the Lower Passaic River (e.g., dredging pilot study, Phase 1 removal), hydrogen sulfide was not reported to be an issue.

Some identified contaminants in the sediment such as PCBs, dioxin, and heavy metals are generally not associated with detectable odors.

The location and depth of dredging operations may impact the odor formation potential. For example, upstream of RM 1.7, dredging will primarily be limited to

removing the top 2.5 feet of sediment, whereas downstream of RM 1.7, dredging within the navigation channel will require the removal of 10 to 15 feet of sediment in some locations. It has been noted at other large environmental dredging operations, odor formation may be more common in areas where deeper excavations have been made, because anaerobic/anoxic conditions are more likely to be present at greater depths and present for a longer time.

The potential for odor formation is based on several factors:

- Concentration of contaminants present in the sediment
- Depth of dredging
- Ability of chemical to volatilize
- Solubility in water
- Vapor pressure.

5.2.4 State and Federal Regulations

There are no established federal standards and guidelines for assessing odor impacts from remediation construction projects. In New Jersey, odor is regulated under the New Jersey Air Pollution Control Act (N.J.S.A. 26:2C-1 and N.J.A.C. 7:27-1.1) and the New Jersey Administration Code (NJAC 7:27-5.2).

5.2.5 Development of Odor Standards

There are several different approaches that are used to regulate odors (Mahin, 2000) including the following:

- The use of ambient air limits for individual compounds such as hydrogen sulfide.
- The use of general regulatory language that prohibits off-site nuisance or annoyance conditions as determined by field inspectors in response to complaints from the public.
- The use of off-site limits based on levels predicted by dispersion modeling.
- The mandated use of best available control technology (BACT) or similar approaches that specify required levels of odor treatment controls for new or upgraded facilities that potentially produce odors (e.g., wastewater treatment plants, incinerators).
- The use of buffer areas and setbacks for facilities that generate odors.

Application of these types of approaches is presented in Appendix XXX.

Rather than a singular threshold level, the odor performance standard uses information generated through several components: understanding of background conditions; potential for odor generation; monitoring; and odor complaint tracking.

Background conditions

During the PDI, the RD Team will collect additional sediment samples to further define

the contaminants in the river sediment. As part of this work, the RD Team will identify the contaminants in the sediment that have the potential to form odors (including hydrogen sulfide emissions). Consideration will be given to both the historical data on sediment constituents as well as information developed during the PDI.

In addition, because of the highly industrial nature of the land uses in and around the project area, consideration will be given to identifying existing odor sources. The evaluation of potential sources can be conducted through a desktop study of potential commercial and industrial facilities located within a five mile radius of the project area, through air quality monitoring, or through the use of "odor panels". Consideration should be given to the impact that weather conditions may have on odor formation.

Potential for Odor Generation

Concentrations of contaminants in the sediment will be used to estimate the potential for these chemicals to diffuse into the atmosphere. These diffuse rate will then be compared to known odor thresholds to assess the potential for odor generation at various locations along the river. This calculation will represent only the likely *potential* for odor generation, not a determination that odors *will* occur. Site specific conditions at the time of dredging within an area will also impact the potential for odor generation but cannot be predicted.

Hydrogen Sulfide H_2S

Based on previous dredging work on the Lower Passaic River, (e.g., dredging pilot study, Tierra Removal Phase 1, RM10.9 removal, H_2S is not anticipated to be a significant odor issue during dredging. However, the RD Team should take into consideration the potential for odors from decaying vegetation and CSO discharges in sediment removed from the river. These types of odors using best management practices.

Odor Complaint Tracking

The RD Team will establish a contingency plan that will provide instruction on addressing complaints and the most appropriate and responsive control for odor issues that may arise during remediation.

5.2.6 Monitoring

Odor measurement is difficult because no instrument has been found to successfully measure a range of odors and its components. The human nose is the only thing that can reliably measure odor, but personal preferences affect what is considered acceptable or offensive. Instruments can measure some concentrations of some compounds that make up odor (such as hydrogen sulfide), but odor is a combination of many compounds. A high or low concentration of just one compound is not generally a good indicator of whether an offensive odor is present.

Two types of field odor monitoring equipment are available.

- One method measures the odor in terms of dilutions to threshold. This equipment cannot be used to determine the actual concentration or chemical makeup of the door but does provide a basis for comparison of the strength of the odor over time, assuming the same odor source.
- A second method is the use of colorimetric tubes. Because the tubes are chemical specific, it is necessary to know the parameter of concern when selecting the tubes.

These types of equipment may be most effectively used as an investigative tool to assess an odor complaint rather than as a monitoring tool to proactively detect potential odors.

In areas where repeated complaints about odors are noted, a routine or periodic monitoring program may need to be established. The primary location for odor monitoring is typically at the receptor's property line. When receptors are close to the dredging operation, monitoring will be conducted at the property line of the receptors nearest to the dredging operations, to the extent practicable, to evaluate compliance with the performance standard. Alternative methods for demonstration of compliance will be evaluated and considered by EPA on an ongoing basis. Prior to implementation of a monitoring program, site conditions will be evaluated; monitoring would occur only near receptors that have the potential to experience an exceedance of the odor standard based on local conditions. The potential for odors from sources unrelated to EPA's remedial action would be taken into account when making this evaluation.

The RD Team will develop the means and methods for monitoring and demonstrate their effectiveness to EPA and NJDEP. Records of the measurement will be made, including specifics of the measurement location, time of measurement, meteorological conditions (barometric pressure, temperature, humidity, wind direction) during the measurement, identification of significant odor sources, and model and serial numbers of all equipment used to make the measurements.

Complaints will be handled as specified in Section 5.8 and the contingency plan.

5.2.7 Mitigation and Contingencies

A contingency plan will be developed by the RD Team to document and evaluate odors reported at and around the project site.

Complaints will be recorded in tabular format and will include the necessary information regarding the complaint and follow-up action needed to resolve the complaint. In the event that there are complaints from the public related to odors, these complaints will be investigated, monitored (if determined attributable to the project), and mitigated as necessary. Multiple complaints regarding the same potential odor source may be treated as one complaint.

Odor mitigation options depend on the location and source of the odor. Options that will work at sediment processing facility may not be viable during dredging or transportation of the dredged solids.

Mobile Operations

Possible mitigation options:

- Change in Technology: Use of hydraulic dredging rather than mechanical dredging. Pumping of dredged solids rather than barge transport. U
- Chemical Additives: Use of chemical additives to prevent odor formation or provide masking.
- Oxygen Addition: (ADD)
- Cover and Contain: Use of water or foam on barges transporting sediment. Maintaining a water layer over sediment in barges during transport.

Stationary Operations

Odors generated at stationary operations will be addressed by NJDEP as part of the enforcement of the air quality permit equivalency process. However all complaints associated with the stationary operations will be tracked under the complaint management system (see Section 6.8) and included in reporting to EPA. Reporting to NJDEP will be in compliance with the permit equivalency process.

5.2.8 Reporting

The RD Team's evaluation of potential odor emissions will be provided to EPA to allow for review and approval before implementation of the project.

Odor complaints will be documented and reported in accordance with the RA CHASP, including investigation, monitoring, and resolution. During operations, a monthly report will be sent to EPA summarizing the monitoring activities for the previous month. The summary will be in a tabular format and will include a log of any odor complaints and the necessary information and follow-up actions needed to resolve the complaint.

5.2.9 Notification

EPA will be notified of odor complaints from the public or of an exceedance of the hydrogen sulfide performance standard within 24 hours of discovery. A report outlining the reasons for the exceedance and the mitigation used to reduce or minimize the odor levels and prevent further exceedances/complaints will be submitted to EPA within ten days of the event. Table 6.2-1 provides a summary of action levels and required responses for odor problems.

5.3 Performance Standards for Noise

5.3.1 Introduction

Potential sources of noise during the RA involve the construction and operation of the sediment processing facility and the dredging and capping of the sediment in the river. EPA anticipates the sediment processing facility will be sited in an industrial area away from most noise-sensitive receptors, near facilities which generate similar levels and types of noise. In addition, the RD team will need to verify that the sediment processing facility will be designed to be in substantial compliance with New Jersey's Noise Control regulations (NJAC 7:29). Therefore the RA activities that are likely to have the greatest quality of life impact on residents and visitors to the project area are the dredging and capping operations along the river. The dredging and capping activities are expected to proceed 24 hours a day, six days per week and 32 to 35 weeks per year for five to six year.

The principal objectives of the noise performance standard areas to prevent noise levels that are harmful to humans and to minimize quality of life impacts from noise on the surrounding communities. The noise impact potential is low below RM 3 where the primary land uses along the waterfront are heavy industrial interspersed with small pockets of residential development. However, above RM 3, and especially above RM 4, noise-sensitive receptors locations such as parks and recreational areas, residential area, schools and hospitals, and other community facilities. The performance standard will be the basis for a monitoring and assessment program to verify that noise impacts are minimized during the dredging and associated activities.

5.3.2 Noise Terminology

Noise is typically defined as unwanted or undesirable sound. The basic parameters of environmental noise that affect human subjective response are (1) intensity, (2) frequency, and (3) variation with time.

- Intensity is expressed using a logarithmic scale in decibels (dB) ranging from 0 to 120-dBs. On a relative basis, a 3-dB change in sound level generally represents a barely noticeable change, whereas a 10-dB change in sound level would typically be perceived as a doubling (or halving) in the loudness of a sound.
- Frequency is related to the tone or pitch of the sound in cycles per second (called Hertz). The human ear can detect a wide range of frequencies from about 20 Hz to 17,000 Hz. Because the sensitivity of human hearing varies with frequency, a single number descriptor that correlates with human subjective response is used; this number is called a dBA which is a weighted value commonly used when measuring environmental noise.
- Time variations occur in environmental noise levels from moment to moment. It is common practice to average sound levels over time into an "equivalent" sound

level (Leq); Leq(h) is used to refer to the Leq sound level over a period of one hour; Ldn (note: Ldn is referred to as DNL in some documents) is the weighted Leq for a 24-hour period with an added 10-decibel penalty imposed on noise that occurs during the nighttime hours (between 10 P.M. and 7 A.M). The Lmax metric is the highest root mean squared sound level within the measuring period. It is time-weighted and is used to characterize the maximum noise level on an A-weighted scale.

5.3.3 Potential Noise Sources Associated with Dredging Projects

Typical reference sound level data for significant noise sources associated with the dredging and barging activities were developed as part of the Hudson River PCB remediation noise impact assessment and are shown in Table 5.3-1 (Epsilon, XX). The equipment and procedures used for the Hudson River project are anticipated to be similar to those proposed for the Lower Passaic River project involving dredging and the use of various watercraft and pumps. The reference distance refers to the distance between the source and the instrument measuring the sounds. For a "point source", noise decreases by approximately 6 dBA when from the source is doubled. For example, a tug boat operating at maximum engine load would have a noise level of 87 dBA at 50 feet, 81 dBA at 100 feet, 75 dBA at 200 feet, etc.

Table 5.3-1 – Reference Sound Levels – Dredging and Barging Operations

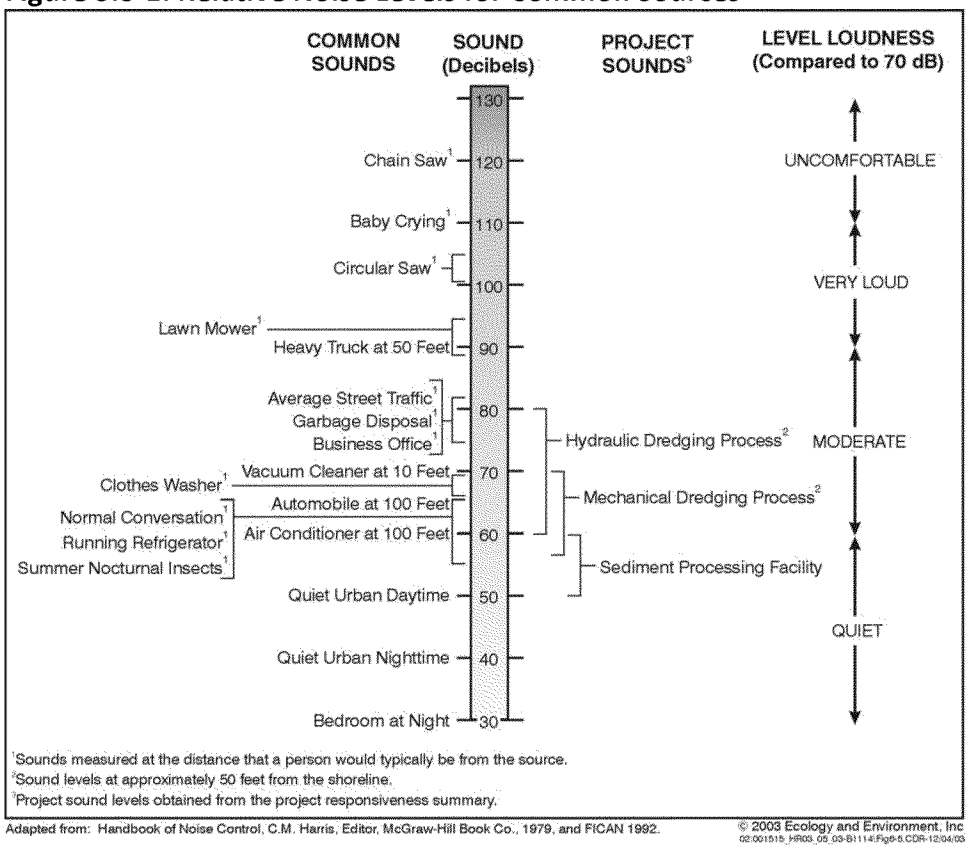
Typical Sound Source	Reference Sound Level per unit (dBA)	Reference Distance (feet)	Data Source	Comment
Tug boat	87	50	Port of Oakland FEIS.	Assumes 900-1000 hp.
Work boat	72	50	25-foot long twin screw tugboat measured at the Island End River site while moving a barge.	Tender tug
Excavator clamshell dredge / backfill	77	50	Caterpillar 345B with 2 cubic yard clamshell bucket measured at the Island End River site.	Bucyrus Erie 88-B clamshell dredge measured at 77 dBA.
Survey boat / crew boat	81	50	New Jersey State Police Marine Division measurements – 1995	Police patrol boat – single 175 hp Johnson outboard engine at full throttle. One boat at a given location.
20 KW electric generator	63	25	WhisperWatt 20kW unit by MQ Power (Multiquip) as measured at the Island End River site.	Equivalent to 57 dBA at 50 feet.
High solids pump	94	3	Schwing BP 8800 concrete pump, Hoover & Keith; Table 7-12.	Rated at 560 hp.

Source: *Epsilon Associates, Inc., Hudson River PCBs Superfund Site. Phase 1 Final Design Report. Attachment J - Noise Impact Assessment, 2006.*

Notes:
Reference sound measurement based on 1 unit
FEIS = Final Environmental Impact Statement
hp = horsepower kW = kilowatt

Figure 5.3-1 provides a comparison of relative noise levels from different types of equipment.

Figure 5.3-1. Relative Noise Levels for Common Sources



Source: U.S. EPA, Hudson River PCBs Superfund Site Final Quality of Life Performance Standards (May 2004)

5.3.4 Local, State, and Federal Noise Standards and Criteria

A number of standards and guidelines for assessing noise impacts have been adopted by federal, state, and local agencies. The following sources of noise standards and guidelines were considered in adopting the noise performance standard:

Laws and Statutes

- Federal Noise Control Action of 1972
- New Jersey's Noise Control Act of 1971
- City of Newark noise control ordinance
- Town of Kearny noise control ordinance
- Borough of North Arlington noise control ordinance

Guidance Documents

- U.S. Department of Housing and Urban Development
- Federal Highway Administration
- New Jersey Department of Transportation
- Federal Transit Administration

Appendix xx provides a summary of these noise standards and criteria. These standards and guidelines should be referenced and include in the RD and RA activities.

5.3.5 Development of the Noise Performance Standard

The numeric performance standards for noise are summarized in Table 5.3-2. These standards were developed based on a review of noise standards established by various federal, state, and local agencies operating in the Lower Passaic River project area as discussed below. The Control Level is the threshold at which investigation of noises sources and mitigation measures are recommended; the Exceedance Level is the threshold at which mitigation measures are required.

Separate noise standards were developed for both residential and commercial areas, in recognition of the lower sensitivity of commercial land uses (as reflected in the various local noise ordinances). No separate standard is proposed for heavy industrial areas where human outdoor activity by the general public is limited or there is no expectation of quiet. In mixed use areas the more stringent residential standards will apply unless the RD or RA team can provide justification for a higher standard.

The RD Team will be responsible for characterizing the existing ambient noise levels in the throughout the PIZ at various times of the day and night through pre-construction noise monitoring. The RD/RA Teams will also be responsible for identifying and documenting conditions in industrial areas prior to the start of construction activities.

Table 5.3-2: Noise Performance Standards

Receiving Land Use	Performance Standard / Control Level	Total Noise Limit[1]		Incremental Noise Limit[2]
		Daytime (7am- 10pm)	Nighttime (10pm- 7am)	Daytime and Nighttime
Residential (including Parkland, Community Facilities	Control Level	65 dBA Leq(h)	55 dBA Leq(h)	Increase of 6 dBA Leq(h) over existing ambient conditions
	Exceedance	75 dBA Leq(h)	65 dBA Leq(h)	Increase of 10 dBA Leq(h) over existing ambient conditions
Commercial	Exceedance	80 dBA Leq(h)	80 dBA Leq(h)	Increase of 10 dBA Leq(h) over existing ambient conditions

Note: Standard measured at receptor property line.

1. Total noise level including RA-related activity combined with existing background noise.
2. Increase over existing background noise due to RA-related activity.
3. No nighttime standard if the commercial business is not operating overnight. For late night or 24-hr commercial facilities, the daytime standard would apply during the nighttime hours.

In addition to a numeric noise standard, an incremental impact standards based on the increase in noise over the existing ambient was established. The purpose of the incremental standards is to acknowledge that there may be areas in the study area where noise levels already exceed the absolute noise standard under the existing condition (such as near major highways, along flight paths, or near industrial sources of noise). Therefore, the numeric noise standard would not be protective or enforceable in these very noisy areas without a noise increment standard. The incremental noise standard is also protective of areas with very low existing noise levels, where the numeric standard level would not be exceeded, but adverse community reaction could still occur because of the relative change in noise levels.

Given that the proposed dredging activities would be moving through different parts of the river and varying in intensity at different times, a standard capable of reflecting short-term peaks in activity was used (e.g., the one-hour Leq [Leq(h]). A longer term equivalent sound level such as Ldn would not be as sensitive to short-term bursts of noise-generating activity that could cause community annoyance and is best suited to more continuous type environmental noise. A standard based on a shorter time period, such as an Lmax standard, would present logistical challenges for compliance, such as one time exceedances due to unusual events (fire truck sirens, etc.). The Leq(h) standard provides a good balance between sensitivity to time-variable noise levels and practical compliance/monitoring issues.

Residential Standards

The daytime residential control level is based on the HUD guidelines (65 dBA Ldn) and FHWA noise abatement criterion for residential land use (67 dBA Leq(h)). This level of noise could generate community response and noise mitigation measures would be recommended. The residential daytime standard is 75 dBA Leq(h) in recognition of the fact that the HUD and FHWA standards are based on long-term exposure as opposed to temporary construction impacts where a higher level is acceptable given the shorter duration of the exposure. The daytime standard is similar to the FTA construction noise criterion of 80 dBA for an 8-hr Leq or 75 dBA for a 30-day average Ldn. The FTA criterion also supports the concept of using a 10 dB increase over existing ambient as a standard in areas where existing ambient levels are very high.

In an effort to minimize sleep disturbance and because background noise levels are lower at night, a nighttime residential noise standard has been established. Nighttime considerations are not required for commercial areas due to the minimal potential for sleep disturbance in those areas. Where commercial and residential areas are mixed, the residential standard will apply. The periods defined as nighttime and daytime are well-established common intervals used in various noise guidelines. Considering that nighttime ambient noise levels are typically 10 dBA lower than during the day, the standard practice for establishing nighttime levels is to apply a 10-dBA penalty to the daytime standard (i.e., decrease the daytime level by 10 dBA).

Commercial Standards

The commercial standard of 80 dBA Leq(h) is based on the FTA construction noise impact criterion of 80 dBA (24-hr Leq).

5.3.6 Demonstration of Compliance

The following actions will be taken to demonstrate compliance with the noise performance standards identified in Table 5.3-7

Noise Study Area

A noise study area will be explicitly defined to focus subsequent modeling and monitoring tasks on those areas most likely to experience noise impacts during the RA. The RD Team will define a noise study area for EPA review and comment. The noise study area should encompass those areas within a minimum of 1,000 feet from all dredging areas and pump stations.

Land Use Inventory

The RD Team will prepare a land use inventory for the study area based on the NJDEP GIS land use data and available municipal or county-level GIS data similar to the information provided in Section 4. The land use inventory will be conducted a parcel level and maintained in a geodatabase format. The land use database will clearly distinguish non-noise sensitive land uses (such as industrial properties) from noise-

sensitive uses. It will also need to distinguish residential, mixed-use and community facilities from commercial properties. The following categories may be refined by the RD Team, adding additional categories as needed:

Non-Noise Sensitive Land Uses

- Industrial/Manufacturing/Warehousing
- Vacant Land

Noise Sensitive Land Uses

- Residential
- Community Facilities. The following is a non-exhaustive list of examples of community facilities:
  - Parkland/Recreational Facilities
  - Schools
  - Cemeteries
  - Hospitals
  - Nursing Homes
  - Daycares
- Mixed-Use Residential/Commercial
- Commercial- Daytime Operations Only
- Commercial- 24-hr or Late Night

Although the database is expected to be based on readily available GIS data, it will require a ground-truthing effort to verify the accuracy of the data. The RD Team will conduct a windshield survey of the noise study area and provide photo documentation of representative noise-sensitive land uses in the study area. The database will be corrected and updated based on the windshield survey.

Baseline Noise Monitoring

The RD Team will conduct noise monitoring prior to construction to determine existing noise levels. The baseline noise levels will be used to calculate the incremental increase in noise due to the RA activities for compliance with the performance standards and to distinguish between RA-related and non-RA related noise.

Prior to conducting the noise monitoring, the RD Team will submit a noise monitoring plan to EPA for review and comment. The plan should address the following elements:

- Proposed locations for representative long-term (minimum of 24-hrs) noise monitoring sites. Monitoring sites will be oriented towards noise sensitive land use clusters and address the variability in baseline noise levels in different neighborhoods based on the configuration of highway, aircraft and train traffic sources.

- Locations of any short-term monitoring sites required to address noise sensitive areas where placement of an unattended long-term monitor is not practical.
- Noise meter equipment models proposed and calibration procedure
- Procedure for monitoring meteorological conditions simultaneously with the noise monitoring and post-processing monitoring data to remove data affected by high winds or rain.

The results of this monitoring will be presented in a **baseline noise monitoring report** prepared by the RD Team, documenting the monitoring effort and results in terms of key noise metric (for example, Lmax, Leq, L50 etc. by time of day presented in tables and charts). The original monitoring data will be provided to EPA in electronic format, along with the post-processed version removing unusual events and high winds/precipitation.

Noise Modeling

The RD Team will be responsible for designing the project to comply with the noise performance standards. An acceptable model (such as CadnaA[3] or SoundPlan[4]) or other appropriate calculations will be used for predicting noise from dredging and sediment processing activities to verify compliance with the standards under typical operating conditions. The Noise Model will assist with planning construction operations to minimize noise and can also be used to assess compliance at particular receptors during construction. For example, if monitored noise levels at the shoreline can be used to estimate the noise level at the source and predict the resulting the noise levels at more distant receivers.

In modeling or preparing calculations, noise emission values shall be obtained from equipment manufacturer(s), when possible, or from standard noise-level reference table or other published sources. In demonstrating compliance with the standards, the following site specific conditions will be evaluated and assumptions documented:

- Existing noise levels- derived from the baseline noise monitoring report, with modifications where appropriate to account for modeled receptors that were not explicitly monitored in the field.
- Source and receptor coordinates
- Typically atmospheric conditions for various times of the year
- Existing barriers to noise transmissions
- Ground conditions and terrain that amplify or mitigation noise transmission, and terrain.

Calculations should include, as a minimum, the attenuation of noise over distance and the combining effect of multiple noise sources; the absorption and reflection off of the

[3] http://www.datakustik.com/en/products/cadnaa/

[4] http://navcon.com/www/content/soundplan-sound-propagation-modeling-software-0

ground and buildings. The RD Team will prepare a **noise modelling report** summarizing the methodologies and assumptions used in the modeling or noise calculations for review by EPA. The report will include a tabulation of the time periods that particular sensitive receptors would potentially experience noise levels above the concern or exceedance levels. The report will discuss modifications to the design of the RA to avoid or minimize predicted noise levels above the exceedance levels delineated for each land use type by the performance standards (both the absolute noise performance standard and the incremental performance standard).

5.3.7 Monitoring

The RD Team will develop a monitoring program for both upland and in-water work for implementation during the RA. Records of the measurement, including specifics of the location, estimated distance to source, time of measurement, meteorological conditions during the measurement, other noise sources in the area, a description of the project-related work and equipment in use at the time of the monitoring, model and serial numbers of all equipment used, and calibration results will be maintained. The RD Team will present the proposed **noise monitoring plan** to EPA for review and comment.

Two types of monitoring will used during the project: routine monitoring for the stationary and mobile operations and complaint-based monitoring.

- **Routine monitoring**
    - **Stationary operations**. Prior to the start of construction, a noise field study will be conducted to assess noise level data at the site(s) where stationary facilities will be located. Data gathered from this study will be used to verify that the design approach and equipment selected will comply with the noise performance standard. During operations, monitoring will be conducted on a regular basis (at least once every four hours) while operations are ongoing. The primary location for noise monitoring is at the receptor's property line. However, if it is determined that noise levels are in compliance closer to the source of the noise, then those locations are acceptable for demonstrating compliance.
    - **Mobile operations**. Prior to the start of dredging operations, a noise field study will be conducted to assess noise level data from the dredging operation at various distances and times of day. Data gathered from this study will be used to verify that the design approach and equipment selected will comply with the noise performance standard. During dredging, monitoring will be conducted on a regular basis (at least once every four hours) while the dredging and capping operations are ongoing. The primary location for noise monitoring is at the receptor's property line. However, if it is determined that noise levels are in compliance closer to the source of the noise, then those locations are acceptable for

demonstrating compliance. For example, during dredging operations the shoreline may be considered an acceptable location for monitoring if the levels are at or below the standard and receptors are more distant.

- **Noise complaint monitoring.** In the event of a noise related complaint monitoring will be conducted in accordance with the complaint management requirements in Section 5.8. Complaints that are not attributable to the project will be noted but will not require follow-up monitoring. If required, monitoring will be conducted at the receptor location from which the complaint was received. This monitoring will be conducted for one hour or as long as needed to collect the data required to resolve the complaint. The person making the complaint may be asked to note time periods when noise levels are disturbing and the duration of the noise. This information will be used to correlate the noise level recorded on the sound-level meter with the disturbance.

  Depending on the nature of the complaint, additional monitoring may need to be implemented to confirm there is no exceedance of the performance standards. For example, a complaint from an area where no noise monitoring was conducted could require supplemental noise monitoring to investigate the issue. If the monitoring reveals the control level is being exceeded, the RD Team will consider additional mitigation. If the control level is not exceeded at the location of the complaint, no further action is required.

RA Noise Monitoring Plan

The RA Team will monitor noise levels during the RA to demonstrate compliance with the performance standards and identify specific locations or activities requiring corrective actions. Monitoring will be conducted in accordance with the proposed noise monitoring plan developed by the RD Team. Modifications to the monitoring plan to address changes due to construction plans will be submitted to EPA for review and comment. The plan should include the following minimum elements:

Noise Study Areas for RA Phases:

An efficient noise monitoring plan will require delineating the specific noise sensitive areas potentially affected by particular construction phases and targeting monitoring resources in those areas accordingly. As a result, it is expected that noise monitoring locations will be shifted throughout the RA construction phases. The RD Team will identify the specific locations warranting noise monitoring in each construction phase, based on the RD noise model and baseline noise levels.

Noise monitoring locations and durations

Unattended 24-hr monitoring will be implemented in the areas where modeled noise levels exceed the concern level. Short-term (1-hr) noise measurements every four hours may be used to address compliance where noise below the concern level is predicted by

the modeling for a particular location. The location of noise monitors may be at the property line of sensitive receptors or closer to the source (e.g., at the shoreline), in which case compliance at receptors will need to be estimated using the noise model.

Noise monitoring equipment specifications

A Type 1 or Type 2 sound-level meter as rated by the American National Standards Institute (ANSI) will be used in measuring noise levels.

Training requirements for noise monitor personnel

Training requirements for noise monitors will be identified in the proposed monitoring plan.

Meteorological and other data collection

The monitoring plan will identify and address types of meteorological data that will be collected during noise monitoring events. Examples of the types of data to be collected include:

- Equipment in use and calibration results
- Monitoring results
- Source/distance to receptors
- Time of day
- Weather conditions
- Prevailing wind
- Activities under way at time at the source area
- Crew (particularly for mobile operations
- Other noise sources in area

Data Handling

Monitoring should be conducted in the slow response mode for continuous equivalent sound level over a 1-hour period (Leq(h)) at the receptor property line while the process or activity is at peak load. The Leq monitoring duration can be shortened to 20 minutes for sources having steady noise emission levels.

5.3.8 Notification and Investigation of Exceedances

Exceedances of the noise standards established in Table 5.3-7 will be reported to EPA in a timely manner as summarized below.

Response to Noise Levels above Control Level

a) Notify EPA through weekly summary report. Reporting needs to include location and time of exceedance, description of the RA work ongoing at the time of the exceedance, and personnel involved.
b) Investigate the cause of the exceedance and whether it is likely to reoccur. The investigation should be undertaken or overseen by personnel with appropriate noise monitoring and mitigation experience, such as Board Certification by the

Institute of Noise Control Engineering (ICNE). Investigations should consider the available noise monitoring data, meteorological data and RA activity information to draw conclusions about the potential causes of noise levels above the control level. If available data is not sufficient to explain the cause of the elevated noise level, additional follow-up monitoring may be required to complete the investigation. Such follow-up monitoring could address whether a particular piece of equipment is generating an abnormal noise level for example. A one third octave band frequency analysis may be used to pinpoint various noise sources and confirm whether or not a particular exceedance of the control level is RA-related.

c) Mitigation is not required for noise levels above the control level, however at this level consideration should be given to additional mitigation if noise levels above the control level occur for more than four hours during the daytime or more than two hours at night. Mitigation could consist of minor operational adjustments or additional control measures (see Section 5.3.6 Mitigation and Contingencies for further details.

Response to Noise Levels above Exceedance Level

a) Notify EPA within 24-hrs by phone or email, and include in weekly summary report.
b) Investigate the exceedance as discussed under control level exceedance, above.
c) Identify and implement mitigation if the exceedance lasts for more than four hours during the daytime or more than two hours at night or if the exceedance is repeated within a one week period.
d) Within ten days of discovery of the exceedance, the RA Team will provide EPA with corrective action report describing causes of exceedance and mitigation implemented.

5.3.9 Mitigation and Contingencies

During the RD, if the design compliance evaluation results indicate that there is a potential to exceed the appropriate numeric standard, mitigation measures to attenuate the anticipated noise levels will be developed as appropriate and included in the design. Mitigation measures may include but are not limited to the following approaches or other proven techniques for noise attenuation:

- Requiring the contractor to use machinery that is quieter than included in the design evaluation and maintaining equipment so that noise-related performance is optimized throughout the remedial program;
- Substituting electric drives for diesel engines where practicable;
- Using electric conveyor belts for material handling where practicable;
- Enclosing noise-producing equipment and areas where possible;
- Isolating and damping vibrating elements;

- Performing routine maintenance;
- Using high-performance mufflers for dredges and other diesel-driven equipment and reducing vehicle running speed (locomotives, trucks, etc.);
- Avoiding excessive gear shifting and throttling;
- Placing operating restrictions on equipment, as appropriate, where engineered approaches are not otherwise available;
- Sequencing construction and dredging operations; and
- Maximizing equipment location using distance and natural or artificial features to attenuate noise and limiting time of operation of construction activities.

As a secondary measure, if the techniques outlined are not sufficient to eliminate a predicted exceedance of the noise performance standard, the installation of portable noise barriers may be necessary in select locations, such as around a booster pump. The design documents will include mitigation to address predictable noise problems, while the contingency plan will be prepared to address additional issues and complaints.

The RD Team will develop a contingency plan to address exceedances of the noise performance standard. During the RA, if monitoring indicates that operations do not comply with the appropriate numeric standards, the contingency plan shall be implemented.

5.3.10 Reporting

Results of complaint investigations, resolution of complaints, and communications with affected parties will be documented on tracking sheets as discussed in Section 5.8. A monthly report summarizing the activities for the previous month will be sent to EPA by the RA Team. The summary will be in tabular format and include the necessary information and follow-up action needed to resolve the complaint.

Results of complaint investigations, resolution of complaints, and communications with affected parties will be documented on tracking sheets as discussed in Section 5.8. The summary will be in tabular format and include the necessary information and follow-up action needed to resolve the complaint.

5.4 Performance Standards for Lighting

5.4.1 Introduction

Lighting-related impacts associated with the implementation of the RA are likely to have the greatest impact during nighttime from either disturbances to residential properties or interfering with traffic (lights in driver's eyes). Because of this, the dredging operations have the greatest potential to generate complaints related to lighting because of the proximity of operations to residential areas, particularly upstream of RM 6.1. In addition, the proposed bypass pumping stations at RM 5.7 and RM 6.1 have the potential to disturb surrounding residential areas and local traffic with nighttime operations. Lighting associated with the sediment processing facility has the potential to impact surrounding areas. However, given the anticipated location of this facility will be in a relatively industrial area with similar night time light levels, the impacts should be minimal.

The intensity of light is measured in a "lumen" which is a measure of the total quantity of visible light emitted from a source. Luminous flux differs from power (radiant flux) in that radiant flux includes all electromagnetic waves emitted whereas luminous flux is weighted according to a model of the human eye's sensitivity to various wavelengths. The illumination level or the quantity of light falling on a surface is typically measured in "footcandles" or "lux." A footcandle is equal to one lumen per square foot and lux is equal to one lumen per square meter. In monitoring light trespass, illuminance is generally measured with a footcandle meter.

5.4.2 State and Federal Standards and Guidance

Regulations addressing of light impacts generally fall under local nuisance conditions ordinances. No specific standards were identified in a review of existing standards regarding acceptable lighting levels.

The primary function of nighttime lighting is for worker safety. To ensure worker safety, on- water work will require a well-lit work area on dredges, barges, and other vessels. However, safety issues aside consideration must be taken of the spillover effect of lighting to ensure that the lights do no disrupt residents or cause of traffic hazard (lights in driver's eyes).

State and federal regulations specify the types of lighting that are required for navigation for recreational and commercial vessels and obstructions placed/moored in the water. These types of lights are generally low level color-coded lights primarily aimed at preventing accidents by warning boaters of oncoming vessels or other objects in the water. Project-related navigation and marker lights in the river are unlikely to results in a quality of life impacts to local receptors. Regulations addressing these types of lights are summarized in Appendix XX. The need for these types of lighting will be addressed by the RD and RA Teams through the design and construction documents.

5.4.3 Development of Standard for Lighting

Key variables that were considered during development of the lighting performance standards included the number and types of light sources, the locations for each of these sources and ambient light levels, and the expected duration of lighting use. In order to minimize lighting impacts, proper beam direction and shielding will be included in the lighting design for both stationary and mobile sources. Land-based sources include the sediment processing facility and the associated storage area and railyard. Water-based sources include the bypass pumping areas near RM 5.7 and RM 6.1, the dredging and capping platforms and associated tugs, barges, and support vessels.

The lighting performance standard was developed based on a review of existing federal and state requirements, available literature, and standards pertaining to lighting. In general, there are few standards and guidelines available for assessing lighting impacts. The Illuminating Engineering Society of North America (IESNA) and the Institution of Lighting Engineers United Kingdom have developed some recommendations that address light trespass (see Appendix XX) which were used in developing the standard presented in Table 5.4-1.

In developing this standard, the PIZ was divided into the following land uses groupings to reflect general lighting scenarios:

- Urban residential areas with low ambient brightness where some roadways would have infrequent streetlights.
- Urban residential areas with medium ambient brightness where most roadways would have street lights that conform to traffic route standards.
- Commercial/industrial areas with high ambient brightness that accommodate a high level of nighttime activity.

Table 5.4-1 Lighting Standard Summary[1]

Land Use Categories	Representative Location	Performance Standard[2]	Demonstration of Compliance
Urban residential areas with low ambient brightness	East Bank between RM 6.1 and RM 8.3	0.2 foot-candle	Monitoring at receptor property line as described under Monitoring
Urban residential areas with medium ambient brightness	Both banks between RM 4.6 and RM 6.1	0.5 foot-candle	Monitoring at receptor property line as described under Monitoring
Commercial/industrial areas with high ambient brightness (e.g.,)	Along West Bank between RM 2.6 and RM 4.0	1 foot-candle	Monitoring at receptor property line as described under Monitoring
1. Standard applies only to light emissions attributable to the Lower 8.3 mile dredging project. 2. Standards apply only during nighttime hours (roughly 7 pm to 7 am) although this may be adjusted seasonally.			

Table 5.4-2 provides a summary of action levels and required responses for lighting problems.

5.4.4 Demonstration of Compliance

During the development of the design documents (plans and specifications), the RD Team will need to address lighting controls for both mobile and stationary sources, to ensure that the design is in accordance with the performance standard for lighting as defined above. The primary concern will be residential areas located near the sediment processing facility (if any) and residential areas in close proximity to the river.

Documentation of the lighting controls to be implemented by the RA team will be provided to EPA along with supporting references as part of contractor work plans to verify that guidelines have been incorporated selected equipment and methodologies.

The following actions will be taken to demonstrate compliance with the noise performance standards identified in Table 5.4-1

Lighting Study Area

A lighting study area will be explicitly defined to focus subsequent modeling and monitoring tasks on those areas most likely to experience noise impacts during the RA. The RD Team will define a lighting study area for EPA review and comment. Property within 2500 feet of the river should be evaluated to determine if lighting from operations in the river will have a potential impact of area receptors. Consideration should be given to natural and man-made screening

Ambient Light Level Monitoring

The RD Team will conduct ambient light monitoring prior to construction to determine existing ambient light levels. The baseline levels will be used to calculate the incremental increase in light due to the RA activities and to distinguish between RA-related and non-RA related noise.

Prior to conducting the noise monitoring, the RD Team will submit a light monitoring plan to EPA for review and comment. The plan should address the following elements:

- Locations of short-term monitoring sites.
- Light monitoring equipment models proposed and calibration procedures
- Procedure for monitoring meteorological conditions simultaneously with the noise monitoring and post-processing monitoring data to remove data affected by high winds or rain.

The results of this monitoring will be presented in an **ambient light monitoring report** prepared by the RD Team, documenting the monitoring effort and results in terms of key metrics. The original monitoring data will be provided to EPA in electronic format.

5.4.5 Monitoring

Nighttime monitoring will be conducted at the shoreline closest to each of the dredging platforms during the initial 2 weeks of dredging operations to assess the lighting impact at the shoreline. Once these conditions have been established, and assuming no exceedances of performance standard levels under worst case conditions, additional monitoring will only be conducted in the event of a complaint regarding lighting impacts or changes to the dredging operation. If it is determined that light levels closest to the source are in compliance, then such locations are acceptable for demonstrating compliance. For example, during dredging operations, the shoreline may be considered an acceptable location for monitoring if the levels are at or below the standard and receptors are more distant. Exceptions to this would include focused light sources such as spot lights; these will need to be addressed on a case by case basis

In areas where repeated complaints about lighting are noted, a routine or periodic monitoring program may need to be established. The primary location for light monitoring is typically at the receptor's property line. When receptors are close to the dredging operation, monitoring will be conducted at the property line of the receptors nearest to the dredging operations, to the extent practicable, to evaluate compliance with the performance standard. Alternative methods for demonstration of compliance will be evaluated and considered by EPA on an ongoing basis.

Where a monitoring program is determined to be necessary to address repeated lighting impact complaints, monitoring would be conducted three times between 9:00 p.m. and dawn at the nearest receptors (or closer to the lighting source). Prior to implementation of a monitoring program, site conditions will be evaluated; monitoring would occur only near receptors that have the potential to experience an exceedance of the lighting standard based on local conditions. Natural and man-made screening would be taken into account when making this evaluation.

If repeated lighting complaints indicate a problem associated with either a specific mobile or stationary source, monitoring will be conducted as follows:

- Monitoring at stationary sites. Monitoring will be performed at the perimeter of the sediment processing facility or bypass pumping station and the receptor's property line (as needed) when the facility initially begins evening activities and when significant changes in lighting for the facility have been made.
- Monitoring for mobile sites. Monitoring would be repeated whenever the dredging operation is moved to a new location on the river.

A foot-candle meter will be used to measure illumination at the property line of the nearest receptors. Records of the measurement will be made, including specifics of the measurement location, time of measurement, meteorological conditions during the measurement, identification of significant light sources, and model and serial numbers

of all equipment used to measure illumination. Other impacts such as glare and sky glow cannot be easily measured. Visual observations must be relied upon in monitoring potential impacts of this nature.

Complaints will be handled as specified in Section 5.8 and the contingency plan.

5.4.6 Mitigation and Contingencies

For both stationary and mobile sources of lighting, the best way to minimize impacts is to include proper beam direction and shielding in the lighting design. Modifications to equipment to improve shielding or control the direction of lighting may be required. As necessary, the RA Team will select and/or modify equipment such that proper beam direction and shielding is included for all outdoor operations unless it can be shown that other screening would mitigate potential impacts.

For stationary sources of lighting, mitigation measures could include use of vegetative and landscape buffers, screens, barriers, and other site and project elements to avoid or minimize impacts. Although the presence of these barriers would not be a primary consideration in the selection of a site for the sediment processing facility, if they were present at the chosen site the facility should be positioned to maximize their use to the extent practicable to screen the site from nearby residential areas. If the selected site requires additional mitigation, these buffers, barriers, and screens could be constructed at a later date

5.4.7 Reporting

Results of complaint investigations, resolution of complaints, and communications with affected parties will be documented on tracking sheets as discussed in Section 5.8. A monthly report summarizing the activities for the previous month will be sent to EPA by the RA Team. The summary will be in tabular format and include the necessary information and follow-up action needed to resolve the complaint.

5.4.8 Notification

EPA will be notified of lighting complaints associated with either mobile or stationary sources as well as any follow-up monitoring or other investigations performed to evaluate the cause of the complaint within seven days. A report outlining the reasons for the exceedance and the mitigation employed to reduce the lighting levels and prevent further exceedances will be submitted to EPA in accordance with the requirements of Section 5.8.

5.5 Performance Standards for Navigation

5.5.1 Introduction

In developing the RD and implementing the RA, consideration must be given to other users of the river (e.g., recreational boaters and commercial watercraft) which are expected to continue to use the river throughout the project. The navigation performance standard was developed to ensure that remedial dredging activities can be completed safely and on schedule while minimizing impacts to recreational and commercial watercraft.

The number and types of vessels required to implement the remedy will be established during the RD and may vary over time and by location, with different approaches to sediment removal and capping taking place in different areas of the river. In general, vessels associated with the RA will include dredges/dredging platforms, barges, tugs, and smaller support vessels. While mechanical dredging will require the use of more vessels on the river and has the potential to interfere with other's use of the waterway, the pipeline used to transport hydraulically dredged sediment will necessitate certain navigational considerations. Dredging methods (by dredge area) will be determined during the RD. In addition, Marine traffic generated by the RA has the potential to interfere with and impact commercial navigation traffic between RM 0 and RM 1.7. Above RM 1.7, marine traffic generated by the RA has the potential to interfere with and impact recreational traffic on the river.

The remedy design and implementation must comply with applicable federal and state navigation rules and regulations that have been established to promote safe and effective vessel movement[5]. This standard also includes additional requirements developed to protect the quality of life for users of the river. The RA Team's adherence to the requirements established in this performance standard for navigation will minimize potential impacts on the community and other entities that also use the river (e.g., commercial and recreational vessels) during remedial activities.

5.5.2 Factors Affecting Navigation

Basic Factors

The following is a summary of factors that will affect navigation in the project area and require consideration during design:

- Existing width and depth of the navigational channel
- Bridges and shoreline obstructions (pier, bulkheads)

[5] CERCLA contains a permit exemption, set forth at Section 121(e)(1), for the portion of a remedial action that is conducted on-site. EPA guidance interprets this permit exemption to apply to all administrative requirements, whether or not they are actually styled as "permits." To the extent that an applicable navigation requirement is procedural rather than substantive in nature, EPA will evaluate, in consultation with US Coast Guard, whether such a requirement should be met for this project.

- Type of dredging operation and associated equipment/support vessels
- The river conditions (seasonal flow variations) and weather conditions
- Duration and time of day of operation
- Vessel traffic patterns
- Vessel working configuration (fleeting) requirements
- Vessel operation and tow clearance

Unique Factors

The Lower Passaic River's width varies from approximately 500 feet to over1500 feet near the Kearny Point mudflats. In addition, man-made obstructions from bridges to piers (active and abandoned), shoreline revetments, and other features are throughout the river.

The following highlights key navigational concerns in the project area.

- Bridge Street and Clay Street Bridges. These two bridges have vertical clearances of less than 15 feet under mean low water conditions.
- Bridges with
- Other bridges between RM 0 and 8.3. Several other bridges between
- Area north of the ---RR Bridge (RM 8.0 to 8.3). North of RM 8.0, the LPR narrows and changes direction restricting the size of vessels that can effectively operate in this area. Rock outcroppings are also present in the area limiting access, particularly under low flow conditions.
- Federal Navigation Channel (RM 0 to 1.7). Although the federal navigation channel extends the
- Kearny Point mudflats. Between
-
-

Project-related river traffic will be controlled and scheduled to minimize, to the extent practicable, adverse effects on the commercial or recreational use of the Lower Passaic River. For example, limiting bridge openings for project-related vessels to off- hours, to the extent practicable, would aid in reducing potential traffic congestion.

5.5.3 State and Federal Regulations and Guidance

The RA Team will be required to comply with applicable federal and state navigation rules and regulations during in-water operations. Compliance with these regulations will aid in completing the remedy without unnecessarily interfering with river navigation. Where rules and regulations overlap, the RA Team will adhere to the more stringent requirement. Applicable state and federal regulations include, but are not limited to, to the following

- U.S. Code Title 33 – Navigation and Navigable Waters, Chapter 9 (Protection of

Navigable Waters and of Harbors and Rivers) Chapter 34 (Inland Navigational Rules of the United States) State of New Jersey Title 13, Law and Public Safety, Section 82 Boating Regulations

- New Jersey Statutes Title 12 Commerce and Navigation, Chapter 7-23.1, Power Vessel Noise Control Act
- New Jersey Statutes Title 12 Commerce and Navigation, Chapter 7-45, Speed of Power Vessels

5.5.4 Development of Standard for Navigation

Table 5.5-1 provides a summary of various navigation activities that will be evaluated by the RD Team to develop a program that will allow the safe use of the river by commercial and recreational users during the RA.

Table 5.5-1. Navigation Performance Standard Activities

Applicable Requirement	Performance Standard	Demonstration of Compliance1
Evaluation of Vessel Movement	Using appropriate models or analyses, provide information on the design of vessel movement and dredging operations so that non-project-related vessel movement is not unnecessarily hindered.	Submit completed analysis (during design) for EPA approval in consultation with USCG.
Restricting Access to Work Areas	Restrict access and provide safe access around work areas. Minimize channel encroachment (to the extent practicable) in consultation with USCG.	Perform required monitoring, reporting, and notifications as described in the standard.
Scheduling Activities	Develop a schedule for remedial activities such that the movement of non-project-related vessels is not unnecessarily hindered.	Perform monitoring, reporting, and notifications in consultation and coordination with EPA.
Notice to Mariners	As necessary, file and distribute Notice to Mariners as required by the performance standard to the USCG.	Notices to mariners are provided with ample time; mariners are notified using all reasonable means prior to performance of activities in the river channel.
Other Temporary Aids to Navigation	As necessary, manage temporary aids to navigation (i.e., lighting, signs, and buoys) as described in the performance standard.	River channel is properly marked for navigation of other watercraft in the channel; occurrences of river channel congestion are limited.

1. Compliance with applicable laws, rules, and regulations that are part of the navigation performance standard will be monitored by EPA and other the applicable agencies as appropriate. In addition, EPA will review vessel monitoring data and input from mariners via questionnaires and investigate complaints to evaluate compliance with all requirements that are established as performance standards.

The RD Team and/or the RA Team will prepare and submit the evaluations specified in Table 5.5-1 based on their proposed remedial construction approach along with the design submittals.

During the RA, an effective communication program is the key component under the Navigation Performance Standard. The RA Team will be required to use all reasonable means of providing Notices to Mariners via the U.S. Coast Guard (USCG) to facilitate navigation of the river channel by other watercraft and to properly notify mariners of anticipated delays in the use of the channel. In addition, the RA Team will provide the public with a schedule of anticipated project activities.

5.5.5 Demonstration of Compliance

The RD Team evaluation of vessel movement will be based on appropriate models or analyses (acceptable to EPA in consultation with USACE, USCG and/or other appropriate agencies). The results of such analyses will be used to assist in the design of vessel movement and dredging operations, including scheduling of remedial activities. The scheduling of remedial activities, including vessel movement, should also be consistent with the engineering performance standard for productivity.

Compliance of the standard will be evaluated based on quantification of observable events before and during the RA as noted in Table 5.5-1. The data required for these quantitative measurements would be obtained through vessel-traffic monitoring, questionnaires completed by mariners, and investigations of complaints filed by users of the river.

5.5.6 Monitoring

The RA team is responsible for monitoring in-river activities that may have an effect on navigation of the river by commercial and recreational watercraft. The RA Team will be responsible for demonstrating compliance with the performance standard for navigation, in part by compiling daily record logs of river navigation activities and issues (with mitigation steps recorded). The RA Team will be responsible for submitting these daily records to, EPA, and other involved agencies on a monthly basis for review to ensure that monitoring of adherence to the performance standard for navigation is adequate and appropriate.

Quantitative measurement of the performance standard will involve demonstrating the level of compliance through consultation with USCG vessel-traffic monitoring, questionnaires completed by mariners, and/or complaints. Vessel traffic will be monitored by the RA Team as a method to demonstrate compliance with the standard. Questionnaires also will be provided to non-project mariners to assess and identify the boating community's quality of life concerns. In addition, complaint response will be established in the RA CHASP and will include investigation, monitoring (as needed), mitigation, and follow-up procedures.

Navigation traffic between RM 0 and RM 1.7 will be monitored. Navigation traffic above RM 1.7 will only be monitored if it is found to impact recreational navigation on as needed basis.

5.5.7 Mitigation and Contingencies

Primary factors that will be considered during design to promote efficient vessel movement and minimize the potential for traffic congestion include the following:

- Maneuverability. The equipment will be capable of maneuvering under bridges and around, through narrow passages, navigation channel, and in shallow portions of the river.
- Vertical Clearance. Equipment must be able to pass through the vertical XX to XX foot clearances above the mean river level or must be able to be lowered or disassembled and reassembled.

Consideration of these dredging equipment factors will aid in mitigating the project's potential impact on non-project-related watercraft using the navigation channel and traffic in the project area.

It is expected that there will be restricted access around work areas undergoing remediation. These restrictions to river access will be coordinated with EPA, USGC, NJ Marine Patrol and are not expected to block access to vessels moving up and down the river.

Work areas in the river will be isolated (access-restricted) where necessary and as determined by the physical characteristics of the river. Where access is restricted around work areas, an adequate buffer zone will be required to ensure that commercial and recreational watercraft can safely pass. To the extent practicable, these buffer zones should allow access to vessels while avoiding such areas. If bank to bank closure of the river is required for safety, advance communications and coordination with EPA, USCG, NJ Marine Patrol and others will be required.

Project-related river traffic will be controlled and scheduled to minimize, to the extent practicable, adverse effects on commercial or recreational use of the LPR. For sections of the river where access cannot be restricted due to the physical characteristics of the river channel, non-project-related watercraft will need to follow the information provided by the RA Team o safely pass through the channel while remediation is being performed.

Scheduled times for navigation of project-related vessels through the bridges that will need to be opened for access may need to be adjusted so that the river can be used by other watercraft while dredging occurs. The remedial operations in the river will need to be coordinated with EPA, USGC, NJ Marine Patrol, and bridge operators to the extent necessary.

Temporary aids to navigation in areas of active work may be necessary and will consist of those items specified by USCG or an equivalent alternative source of information authorized for use by NJ Marine Patrol and/or the USCG. Before placement of

temporary navigational aids, the RA Team will consult with NJ Marine Patrol and/or the USCG. The Marine Patrol and/or the USCG will issue a Notice to Mariners. In addition to the Notice to Mariners, the public will be informed of the planned action using methods that may include the following (after consultation with EPA, and/or the USCG):

- Communication with bridge operators during bridge usage;
- Broadcasting on appropriate marine frequencies
- Posting notices at marinas, boating docks/ramps, and locks;
- Contacting commercial and recreational user groups; and
- Posting on a publicly accessible Web site.

The following contingencies/mitigation measures may be used to minimize traffic congestion on the river if determined during design or during remedial activities to be safe and appropriate:

- Placement of dredging equipment to limit the overall areas used at any one time in order to minimize channel encroachment during dredging operations;
- Scheduling work (including in areas adjacent to the channel) to minimize delays, which may include scheduling certain remedial activities to occur during off-peak hours of canal use;
- Establishing times of dredging vessel and equipment movement from one location on the river to the next;
- Creating new areas (by widening the existing navigation channel) or using existing areas along the channel where primarily project-related vessels can move out of the main navigation channel (i.e., passing lanes) to allow other vessels to pass;
- Establishing areas (in strategic locations) where vessel traffic can be controlled to allow safe passage;
- Adhering to an established dredging schedule in terms of hours of operation and location;
- Applying restrictions to other watercraft traffic in the immediate vicinity of the dredging operations (for safety purposes and efficient vessel movement);
- Using in-river postings and/or temporary aids to navigation; and
- Adhering to required clearance in the navigational channel so that non-project-related vessels can move through the area without being unnecessarily impeded; and

5.5.8 Reporting

A monthly navigation monitoring report summarizing monitoring activities for the previous month will be sent by the RA Team to EPA. If monitoring of the remedial activities indicates noncompliance with the performance standard for navigation, the RA Team will be required to submit daily reports for EPA for review with appropriate action

plans until such time that monitoring indicates compliance. The navigation report will be in a tabular format and will include a log of navigation complaints and include the necessary information and follow-up actions needed to resolve the complaint.

Results of complaint investigations, resolution of complaints, and communications with affected parties will be documented on tracking sheets as discussed in Section 5.8. A monthly report summarizing the activities for the previous month will be sent to EPA by the RA Team. The summary will be in tabular format and include the necessary information and follow-up action needed to resolve the complaint.

5.5.9 Notification

EPA will be notified of complaints related to navigation or interference with the use of the river as well as any follow-up monitoring or other investigations performed to evaluate the cause of the complaint within seven days. A report outlining the reasons for the exceedance and the mitigation employed to reduce the lighting levels and prevent further exceedances will be submitted to EPA in accordance with the requirements of Section 5.8.

EPA, USCG and NJ Marine Patrol will provide the RA Team with information concerning interference with navigation on the types of situations that require immediate notification.

EPA and other appropriate agencies will be notified by the RA Team within 24 hours of discovery of a deviation from the performance standard that can be easily and immediately mitigated (at concern level). Where potentially unsafe conditions or conditions that impact navigation (exceedance level) may result from project-related activities in the river, immediate notification of EPA is required. A report outlining the reasons for the deviation and the mitigation employed will be submitted to EPA within ten days of the event.

5.6 Performance Standards for Traffic

5.6.1 Introduction

Successful execution of the RA within the estimated duration in the ROD will require efficient and timely movement of materials, equipment and personnel both on the water and on land. To accomplish this while minimizing the impact to other users of the waterways, roads, and railroads will require careful coordination and planning.

5.6.2 Sources of Traffic Impacts

A number of RA activities will potentially result in traffic impacts

- Barges and tugs traffic to transport debris as well as for transporting cap materials and backfill.
- If selected, mechanical dredging will require the transport of sediment from the dredge sites to the sediment processing facility.
- Localized short-term traffic impacts during construction of the sediment processing facility and the bypass pumping stations (for mechanical dredging) and the setup of booster pumping stations along the hydraulic pipeline (for hydraulic dredging) are likely.
- Personal vehicles of construction workers during building and operation of the sediment processing facility.
- Rail transport of processed sediment will occur periodically throughout the process (typically one to three pulls per week)

5.6.3 State, Federal, and Local Traffic Standards and Criteria

The following federal, state, and locals and New Jersey regulations have been identified as being applicable to and governing the RA operations. These regulations and other applicable regulations, should be reviewed and their requirements incorporated in the RD and RA planning documents.

- USCG drawbridge operation regulations for moveable bridges across the Passaic River (33 C.F.R. § 117.739 – Passaic River).
- NJDOT Rules Governing the Opening and Closing of Moveable Span Bridges (Drawbridges) (NJAC 16:46)
- NJDOT Traffic Regulations and Traffic Control Devices (NJAC 16:27)
- NJDOT Truck Access (NJAC 16:32)
- NJDOT Transportation of Hazardous Materials (NJAC 16:49).
- NJDOT Complete Streets Policy #703 (adopted 2009).
- City of Newark Complete Streets Policy (Resolution #7R4-D adopted 2012).

5.6.4 Development of Standards for Traffic

There are no established standards and guidelines available for assessing traffic impacts from remediation construction projects such as that envisioned in the lower 8.3 miles of

the Lower Passaic River. In lieu of published guidance, the Traffic Quality of Life Performance Standard was developed with the following objectives:

- Minimize the disruptions in traffic in the areas surrounding the site.
- Communicate with impacted groups regarding plans for remediation that will impact marine, road, or rail traffic.
- Prevent safety hazards due to increased truck traffic, particularly on residential streets.
- Prevent safety hazards from increased marine traffic in the lower 8.3 miles of the river.

To achieve these objectives, the RD Team will develop a Traffic Management Plan that addresses truck, rail, and marine traffic in the vicinity of the site. This plan will be reviewed and approved by EPA, the State of New Jersey, and the USCG. Input in the development of the plan will be solicited from the City of Newark and other stakeholder groups. In addition, EPA will seek input from the businesses along the navigation channel and the Community Advisory Group and forward such input to the RD Team. The RD Team will address and incorporate their suggestions to the maximum extent practicable. The Traffic Management Plan when approved by EPA will become the de facto traffic performance standard.

The Traffic Management Plan will, at a minimum, address the following topics:

- Minimizing the number of openings of aging moveable bridges to the maximum extent practicable.
- Controlling the timing and durations of planned dredging and capping/backfilling near or adjacent to commercial berths and docks in the lower 1.7 miles.
- Communicating with area residents and visitors to ensure that:
    - Recreational users of the river are provided advance notice of planned dredging and capping/backfilling in different reaches of the river.
    - AMTRAK, New Jersey Transit, and Port Authority Trans Hudson railroads are provided with sufficient advance notice of any planned bridge openings.
    - Conrail is provided with sufficient advance notice of all planned opening of the Point-no-Point Conrail freight railroad bridge at RM 2.6.
    - Commercial shippers are provided advance notice of planned dredging and capping/backfilling in the navigation channel.
    - Drawbridge openings are publicized in advance to vehicle users.
- Developing a rail shipping schedule with Conrail that:
    - Identifies the number and types of rail containers to be shipped from the site during various phases of the remedial action on a daily, weekly, annual basis.
    - Identifies rail routes and traffic impacts in the area near the sediment processing facility.
    - Identifies the need for storage for rail containers in the rail yard adjacent to the sediment processing facility.

- Developing a plan for management movement of supplies and shipments on surface roads including the following:
    - An estimate of the number and types of over-the-road (OTR) vehicles (commercial and personal) likely to be present during various phases of the remedial construction on a daily, weekly, annual basis.
    - Need for on-site or off-site equipment storage areas (including space required for OTR hauling equipment) to avoid parking or idling on adjacent roadways.
    - Traffic routes for vehicles entering or exiting the sediment processing facility or other support facilities.
    - Monitoring program for preventing traffic on non-approved area roads (residential streets).
    - Program for preventing / controlling nuisance conditions (litter, air emission/noise from idling trucks, other) from vehicles entering or leaving the site.
    - Periods or types of events occurring in the area during which truck traffic should be minimized because additional traffic would cause disruptions to the overall traffic patterns on local roads and highways.
- Preparing contingency plans and mitigation measures in the event that requirements are not met.

5.6.5 Demonstration of Compliance

During the development of the design documents, the RD Team will need to explicitly address traffic controls for both mobile and stationary sources, to ensure that the design is in accordance with the performance standard as defined above. Documentation of the traffic controls to be implemented by the RA team will be provided to EPA along with supporting references, to verify that guidelines defined above have been incorporated into the design. Alternative methods for demonstration of compliance, such as traffic level monitoring, will be evaluated and considered by EPA on an ongoing basis.

During the RA, compliance will be assessed by tracking of traffic-related complaints, including location, frequency of complaint, and area of impact. If a pattern of complaints is indicated through the complaint tracking log, EPA may require regular monitoring or other mitigative measures.

5.6.6 Monitoring

Construction Monitoring

During construction of the sediment processing facility, major traffic routes into and out of the site will be identified and monitored periodically to determine if construction - related traffic is resulting in traffic impacts. In addition, traffic routes will be monitored for an accumulation of litter, damage to road surfaces, or other indications of traffic impacts on the local infrastructure. Based on the selected site, the RD Team will develop a monitoring plan and appropriate monitoring locations.

Operations Monitoring

During operations, traffic impacts are likely to focus on enforcement of traffic routes into and out of the sediment processing facility; the impact of rail operations on local traffic patterns, and the impact of bridge openings on local traffic patterns. The RD team will develop a traffic monitoring program to assess each of these, and potentially other, areas.

Other Monitoring Methods:

A variety of methods for monitoring traffic impacts should be considered. For examples, traffic cameras and conventional traffic measurement devices may be available for monitoring potential impacts of vehicular traffic attributed to the RA. The website http://511nj.org has valuable tools that can be used to monitor traffic congestion including live traffic cameras along major routes in Newark and Essex and Hudson counties such as Route 9, Route 21, I-95, and I-280.

Monitoring Frequency:

Monitoring will vary depending on the phase of work and the number/types of complaints received. During construction and initial phases of dredging operations, a regular monitoring program should be implemented at key locations. Once traffic patterns are established, it may be possible to reduce the frequency of monitoring. Monitoring will be repeated whenever the dredging operation is moved to a new location on the river or at the annual startup, to verify that operational changes are not resulting in traffic impacts.

Complaints will also be handled as specified in Section 5.8.

5.6.7 Mitigation and Contingencies

Mitigation of violations of the traffic performance standard will depend on the location of the complaint and type of infraction. For example, traffic backups on local roads due to opening of moveable bridges when dredging and/or capping equipment has to be moved from one reach of the river to another may be unavoidable and the possible mitigation may be to provide sufficient advance notice of the infrequent events so that local drivers can plan alternate routes. On the other hand, if trucks transporting materials and equipment to and/or from the sediment processing facility repeatedly fail to use designated roads and take short-cuts through residential neighborhoods, the local police can issue traffic summons and after investigating the complaint, the RA contractor can terminate their contract, if appropriate.

The RD Team will identify potential traffic-related impacts that may occur during the various stages of work and develop mitigative measures to be taken in the event these occur.

5.6.8 Reporting

Results of complaint investigations, resolution of complaints, and communications with affected parties will be documented on tracking sheets as discussed in Section 5.8. A monthly report summarizing the activities for the previous month will be sent to EPA by the RA Team. The summary will be in tabular format and include the necessary information and follow-up action needed to resolve the complaint.

5.6.9 Notification

EPA will be notified of traffic-related complaints associated with either mobile or stationary sources as well as any follow-up monitoring or other investigations performed to evaluate the cause of the complaint within seven days. A report outlining the reasons for the exceedance and the mitigation employed to address the complaint and prevent further problems will be submitted to EPA in accordance with the requirements of Section 5.8.

5.7 Communications Plan

A timely, well managed communications program can do much to improve the QofL of people dealing with the impact of construction. To be effective, the information needs to be provided in a timely manner and on a consistent basis. A number of tools are available for communicating with the local groups during the RA

- **Website.** A website providing information that is updated in a regular, timely manner and informing
- **Flyers and mailers (hard copy or electronic).** While these may have limited impact, they can provide information to targeted populations. For example, inserts in utility bills for residents and businesses in the PIZ informing them of monthly work schedules can increase receptor awareness. Sending this type of information to business in PIZ can allow them to inform their consumers of work and the impact, if any, on their business.
- **Radio and television announcements.** For some events, public service announcements on radio and/or television can inform the population of special activities during the RA that
- **Electronic billboards.** These are effective of informing localized populations of activities occurring now or in the near future that will affect the area. For example, placing portable billboards along roadways leading to drawbridges that will be opened in advance of the opening and including the time and estimated length of the delay can allow drivers to take other routes. For driver that continue to use the route planned for temporarily closure, it will provide information on the extent of the delay

The time of information that should be included in the communications program include but is not limited to the following:

- Project schedule elements such as the start and end of in-water work; river location where and when dredging and capping activities will occur; river closure; movement of equipment that will necessitate drawbridge openings; shipment of large equipment that may cause traffic delays; and other activities that will impact area residents and visitors.
- Monitoring programs and regular updates monitoring results
- Changes and modifications to previous announced schedule and events.
- Information on the equipment that is being used in the river and how it operates.

Therefore, the RD team will develop and the RA team will implement a communications program to address items presented under the QoLPS. This information will be updated on a regular basis but no less timely than once per week.

5.8 Complaint Management

A well-developed, transparent and effective system for receiving, tracking and addressing complaints is a critical element in the managing the QofL for receptors in the PIZ and surrounding area. Therefore, the RD team will develop and the RA team will implement a complaint management system to address public complaints on the implementation of the RA.

Given the high visibility of the project, it is anticipated that some nuisance complaints may be received, particularly in the initial stages of the project. As appropriate, the complaints should be logged and tracked as presented in the complaint management system. However, if a large number of the unsubstantiated nuisance complaints are received, further actions should be discussed with EPA regarding their resolution.

At a minimum, the complaint management system will consist of the following elements:

- **Receipt of complaints.** The system will include a variety of methods for the public to enter complaints regarding the impact of the RA including regular mail, electronic mail, and telephone with messaging system. Other options such as the use of social media and the internet may warrant inclusion.
- **Tracking of complaints.** Each communication will be entered on to an electronic complaint form and cross referenced in an electronic tracking log under an individual tracking number.
    - The form should include such information as the name of person registering complaint; contact information for person registering the complaint; date complaint was received; time, date and location of incidence causing complaint; description of incident; and other pertinent information.
    - The tracking log will provide, at a minimum, the tracking number, name of person registering the complaint, and general description of incidence. Enough information will be provide on the tracking log to cross reference and locate the complaint form.
- **Investigation.** Each complaint will be investigated as to validity, applicability to the project, cause, and impact of the incident on the person entering the complaint and others in the area. Results of the investigation will be entered into the complaint form along with recommendations for follow action to be taken by the RA team to resolve the complaint and prevent future incidents. As appropriate, complaints should be addressed as presented in the site contingency plan developed by the RD team.
- **Resolution.** The results and recommendations will be forwarded to the appropriate members of the RA team for implementation with a copy to EPA. The resolution will be tracked on the complaint form.
- **Follow-through.** Depending on the complaint, it may be appropriate to respond to the person registering the complaint as to the resolution of the complaint and seeking additional feedback on the RA's impact.

A summary of the complaints received and their resolution will be provided to EPA in monthly reports along with a copy of the tracking log for the last 90 days and any older but unresolved complaints.

6.0 Finalizing the Standards

TBD

7.0 References

Section 1

Section 2

Section 3

Section 4

Section 5

Air Emissions Performance Standards (Section 5.1 ---)
Odor Performance Standards (Section 5.2)
Noise Performance Standards (Section 5.3)
Lighting Performance Standards (Section 5.4)

IESNA Technical Memorandum TM-11-00, *Light Trespass: Research, Results and Recommendations*.
Rea, M.S., ed. 2000. *IESNA Lighting Handbook: Reference and Application, 9th edition*. New York: Illuminating Engineering Society of North America.
Institution of Lighting Engineers (ILE). 2000. *Guidance Notes for the Reduction of Light Pollution*. Warwickshire, UK: the Institution of Lighting Engineers.
Illuminating Engineering Society of North America (IESNA). 1999. *Recommended Practice for Outdoor and Environmental Lighting*, IESNA RP-33-99. New York: Illuminating Engineering Society of North America.

Navigation Performance Standards (Section 5.5)
Traffic Performance Standards (Section 5.6)

List of Tables

List of Figures

Appendices
Appendix XX - Fundamentals and Definitions (Noise and Lightning)
Appendix XX - Supplemental Navigation Information (Regulations and Factors Affecting Navigation)
Appendix XX – Air Emission
Appendix XX